



CITY OF MANCHESTER.

REPORT

ON THE

Health of the City of Manchester,

1898.

BY

JAMES NIVEN, M.A., M.B.,

Formerly Fellow of Queens' College, Cambridge.

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PUBLIC HEALTH OFFICE,

TOWN HALL, MANCHESTER,

AUGUST 9TH, 1899.

MY LORD MAYOR, ALDERMEN, AND MEMBERS
OF THE COUNCIL.

I have the honour to place before you the Report on the Health of Manchester for the year 1898.

There is reason for believing that the population of Manchester will be found at the next Census to be under-estimated. It is, therefore, a source of legitimate satisfaction to find that the death-rate for 1898 was not higher than 21 per 1000. At the same time the infantile death-rate was high, due to the excessive incidence of Summer Diarrhœa. Enteric Fever also was present in excessive amount towards the end of the year.

The very defective character of the arrangements for the collection of excreta, more especially in the outer portions of the City, is undoubtedly responsible for much disease. This question has been brought forward year after year in various sections of these Reports. It would much improve the health of many parts of this City if good water-closets of a type approved by the Sanitary Committee were fixed in place of the present insanitary closets, the surface of the yards and passages, as well as the drainage, being at the same time put in good condition.

A severe storm of Measles has visited this City during the years 1895–1898. A lull occurred in the last-named year, but this year again the mortality has been excessive. Blackburn in 1895, and Salford and Preston in 1897, have undergone even more striking experiences. This decided increase of mortality demands attention, and calls for strenuous efforts on the part of all concerned, the Sanitary Authority, Parents, and School Authorities.

The bacteriological investigation of infectious diseases continues to yield most valuable results in the hands of Professor Delépine as regards Enteric Fever and Diphtheria, and the complete success attending our efforts to get cases of these diseases carefully diagnosed is matter for satisfaction. The Sanitary Authority and the Medical Practitioners have to thank each other for the aid which each has given to the other.

The attention of the Sanitary Authority has been in the past year directed to the control of Tuberculosis, so far as the importation of that disease into the City through milk is concerned, and special legislation has been obtained of a highly important character. For the successful piloting of this legislation credit is due to the Chairman and Members of the Sanitary Committee, as

well as to the Lord Mayor ; while the final form of the clauses, as well as the happy result, are due in large measure to the officials of the Local Government Board. The Council have recently endorsed a Report approved by the Sanitary Committee in regard to the Notification of Phthisis. To carry the scheme indicated in that Report into effect will, however, require unremitting effort for a number of years, and will require also very careful management. The Report mentioned has been incorporated in the Annual Report, as marking the grounds on which this step has been taken by the City Council.

An important scheme for the improvement of Monsall Hospital was put forward during the year, involving an estimated expenditure of £27,500. This scheme was sanctioned by the Local Government Board, and some of the buildings are now in course of erection.

A large scheme for the Housing of the Working Classes on areas off Oldham Road, Chester Street, and Pott Street, involving the erection of houses for 1,070 persons, and the provision of a Model Common Lodging-house in Harrison Street, Ancoats, for 363 men, is now approaching completion.

These important schemes have been prepared by the City Surveyor, and have received assiduous attention from the Sanitary Committee in the elaboration of details. They have been explained in Reports, with which the Council is familiar.

The entire subject of Common Lodging-houses is one calling for special inquiry and report, which will be made at an early date.

A section has been devoted to the subject of Housing of the Working Classes, which is intended to present the situation as it now stands, so as to emphasize the need for further action on lines which have been already laid down by the Chairman of the Sanitary Committee as regards cheap and convenient transit by train and tram. The Sanitary Committee have given considerable time and effort to this question.

A proposal for the erection of a Smallpox Hospital has now been generally approved of by the Council, although the details still remain to be considered, and plans will be submitted by the City Surveyor at an early date.

A scheme will be brought forward for the erection of a Disinfecting Station.

A section of the Report deals with the work already done in connection with Cellar Bakehouses, and with the more general action which now seems desirable.

It will be seen that much valuable work has been done during the year 1898 by the Sanitary Committee and by its Sub-committees.

Attention is called to the efforts of the Chairman of the Sanitary Committee and of Mr. Rook to improve the Food and Drugs Act, 1899, which have been crowned with some measure of success.

It is necessary, in issuing this Report, to call attention to the Report of the Sanitary Superintendent (Mr. Rook), and to acknowledge his hearty co-operation in that part of the work which is common to both of us. Mr. Rook's report is a summary of excellent and extensive work carried out under his supervision.

It is proper that I should acknowledge the valuable aid which I have received from my colleagues and from my clerks in the preparation of Vital Statistics and in administration.


I have the honour to be,

My Lord Mayor and Gentlemen,

Your obedient Servant,

JAMES NIVEN,

Medical Officer of Health.



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ANNUAL REPORT.

STATISTICAL.

The more outstanding figures relating to the year 1898 are as follows :—

Estimated population by the Registrar-General...	541,296
Persons married in Manchester, Prestwich, and Chorlton Unions	11,934
Annual rate of persons married per 1,000 of population.....	18·3
Births ... { Males..... 8,800 } { Females..... 8,686 }	17,486
Annual rate of births per 1,000 of the population...	32·3
Deaths ... { Males..... 5,978 } { Females..... 5,515 }	11,493
Annual rate of mortality per 1,000.....	21·2
Excess of registered births over deaths	5,993
Estimated increase of population during the year	4,870

The principal causes of death during the year were :—

Bronchitis	981	Old Age	219
Pneumonia	1,188	Measles	271
Tubercular Disease	1,525	Whooping Cough.....	170
Diarrhoea and Simple Cholera	1,090	Debility, Inanition	677
Diseases of the Circula- tion	1,051	Premature Birth	373
Diseases of the Diges- tive System	544	Convulsions	209
Cancer	394	Inflammation of Brain	169
		Bright's Disease	181
		Enteric Fever	120
		Apoplexy	290

The estimate of population by the Registrar-General as given above is probably too low, if we may judge by the number of houses which continue to be erected. The birth-rate and death-rate on this supposition would both be too high. The birth-rate again shows a steady downward tendency.

If we assume that the Unions of Manchester, Chorlton, and Prestwich will have birth-rates and death-rates not materially differing from those of Manchester, we find that the average excess of birth-rate over death-rate in the years 1894-98 was 10·6, while in the years 1889-93 it was only 8·3. Now, although the increase or decrease of the death-rate may arise from causes so widely different from those causing the increase or decrease of the birth-rate that the difference in their rates, which represents the rate of increase of the population irrespective of migration, may have no significance for any given year, yet over a number of years it must be taken as an indication partly of prosperity or adversity, and partly of improvement in health conditions or the reverse.

A natural increase of 10·6 per 1,000 to the population must be regarded as good, and considerably exceeds the increase of the population estimated to be taking place by the Registrar-General. Moreover, 1898 is the third consecutive year in which the death-rate has been below 23 per 1,000, and has the next lowest mortality of any year except 1894. It is to be feared that 1899 will not witness a continuance of the reduction which appeared to be occurring in the death-rate, as the severe outbreak of influenza which we are passing through not only raises the death-rate at the time, but will leave behind it a considerable amount of depression and weakness.

It will be seen that 1898 was a good year in respect of lung diseases, and, with the exception of enteric fever, in respect of zymotic diseases generally, but that the diarrhoea mortality was even greater than in 1897, which was a bad year. Diseases of the circulation underwent a considerable increase in 1898.

As regards the general influences at work in this City, apart from specific influences attaching to places and character of employment or to the conditions of housing, &c., without being able to give details of wages, we may say generally that employment during 1898 was steady, and that good

wages were earned. On the whole the price of living increased somewhat, as will be seen from the following table :—

TABLE I.—TOWNSHIP OF MANCHESTER.—PRICES PAID BY THE GUARDIANS FOR FLOUR, BUTCHERS' MEAT, AND COAL; ALSO THE AVERAGE NUMBER OF PERSONS IN RECEIPT OF RELIEF DURING THE YEARS 1887-1898.

YEAR ENDING	PRICES OF PROVISIONS						PAUPERISM		BIRTH- RATE PER 1,000
	Flour per Sack of 28lbs.	Butchers' Meat, per lb.			Coal, per ton		Average number of Paupers relieved in each week		
		Beef		Mutton	Engine	House	Indoor	Outdoor	
		Coarse	Fine						
1887	25/2 to 30/6	-/3 ³ / ₄	-/6 ¹ / ₂	-/6 ¹ / ₂	5/6	8/4	3123	877	33·9
1888	24/- to 29/3	-/3 ³ / ₄	-/6 ¹ / ₂	-/6 ¹ / ₂	5/5	8/3	3130	713	33·3
1889	24/11 to 31/2	-/4 ¹ / ₂	-/6 ¹ / ₂	-/6 ¹ / ₂	5/8	8/7	3037	632	33·1
1890	24/9 to 29/11	-/5	-/7	-/7	7/-	9/9	2998	498	31·8
1891	27/3 to 28/11	-/4 ¹ / ₄	-/6 ¹ / ₂	-/6 ¹ / ₂	8/8	11/2	3118	466	33·8
1892	26/4 to 28/5	-/4	-/6 ¹ / ₄	-/6 ¹ / ₄	7/6	10/2	3251	551	33·4
1893	21/8 to 25/1	-/3 ⁷ / ₈	-/6 ¹ / ₄	-/6 ¹ / ₄	6/5	10/0	3277	586	33·4
1894	17/2 to 23/9	-/3 ³ / ₄	-/6	-/6	7/1	10/10	3328	395	31·8
1895	15/6 to 21/-	-/3 ³ / ₄	-/6	-/6	5/6	10/3	3343	618	33·4
1896	16/6 to 24/-	-/3 ⁵ / ₈	-/5 ³ / ₄	-/5 ³ / ₄	5/7	9/1	3348	533	32·8
1897	17/3 to 33/9	-/3 ¹ / ₂	-/5 ⁵ / ₈	-/5 ⁵ / ₈	5/9	8/8	3476	697	32·9
1898	26/7 to 33/8	-/3 ¹ / ₂	-/5 ¹ / ₂	-/5 ¹ / ₂	6/2	8/4 ¹ / ₂	3519	732	32·3

There is shown here very great increase in price of the cheaper qualities of flour, while the prices of mutton and coal are lower than in 1897. So far as these prices are concerned the balance is against the year 1898, the rise in price of flour much more than outweighing the cheapening of other articles.

We perceive also that the average number of paupers relieved in each week by the Manchester Guardians, both indoor and outdoor, has undergone a considerable increase, a singular commentary upon the general air of enterprise and prosperity which prevails.

The position in which we stand for the year may be best seen by forming a table of gains and losses in the death-rate from various diseases per 1,000 persons living as compared with the average of the previous seven years.

Gains in 1898.

Measles	0·26
Scarlet Fever.....	0·15
Whooping Cough.....	0·32
Diphtheria.....	0·14
Enteric Fever	0·01
Influenza	0·16
Erysipelas	0·01
Pyæmia	0·01
Puerperal Fever	0·02
Rickets	0·01
Phthisis	0·13
Tubercular Disease other than Phthisis	0·06
Old Age.....	0·08
Brain and Nervous Diseases	0·43
Bronchitis	0·72
Pneumonia	0·24
Other Respiratory Diseases.....	0·14
Digestive Organs	0·06
<hr/>	
Total	2·95
<hr/>	

Losses in 1898.

Diarrhoea	0·75
Rheumatic Fever	0·02
Cancer	0·08
Premature Birth	0·11
Heart Diseases	0·19
Urinary Organs.....	0·03
<hr/>	
Total	1·18
<hr/>	
Balance of Gain	1·77
<hr/>	

The actual balance of gain is 1·92 per 1,000.

The position of this City amongst the 33 great towns is shown by Table 2, from which it will be seen that only two towns have a higher death-rate, viz., Liverpool and Salford. Thus the comparatively low death-rate of last year is not to be ascribed to any relative improvement in the conditions of life in Manchester. Such improvement as is manifested is shared in by other towns,

and that in even a greater degree, as will be seen from the accompanying table, extracted from the Registrar-General's Annual Summary:—

TABLE 2.—RECORDED AND CORRECTED DEATH-RATES PER 1,000 PERSONS LIVING IN 33 GREAT TOWNS DURING THE YEAR 1898.

TOWNS in the order of their Corrected Average Death-rates	Standard Death-rate	Factor for correction for Sex and Age distribution	Recorded Death-rate, 1898	Corrected Death-rate, 1898	Compara- tive Mortality Figure, 1898
	Col. 1	Col. 2	Col. 3	Col. 4	Col. 5
England and Wales	19·15	1·0000	17·58	17·58	1,000
England and Wales less the 33 Towns	} 19·45	0·9845	16·78	16·52	940
33 Towns	17·71	1·0813	19·03	20·58	1,171
Croydon	18·37	1·0424	13·89	14·48	824
Cardiff	17·16	1·1159	14·82	16·54	941
West Ham	17·75	1·0788	15·41	16·62	945
Portsmouth	18·73	1·0224	16·30	16·67	948
Brighton	18·94	1·0110	16·91	17·10	973
Bristol	18·33	1·0379	17·20	17·85	1,015
Norwich	19·99	0·9579	18·96	18·16	1,033
Leicester	17·64	1·0855	16·93	18·38	1,046
Huddersfield	16·47	1·1627	15·92	18·51	1,053
Derby	17·36	1·1031	16·82	18·55	1,055
Burnley	16·67	1·1487	16·30	18·72	1,065
Plymouth	19·70	0·9720	19·54	18·99	1,080
Nottingham	17·81	1·0752	17·67	19·00	1,081
Birkenhead	17·42	1·0993	17·44	19·17	1,090
Hull	18·23	1·0504	18·36	19·29	1,097
Halifax	17·20	1·1133	17·87	19·89	1,131
London	17·97	1·0656	18·68	19·91	1,133
Oldham	16·72	1·1453	17·58	20·13	1,145
Bradford	16·73	1·1446	17·60	20·14	1,146
Swansea	17·53	1·0924	18·57	20·29	1,154
Blackburn	17·05	1·1231	18·45	20·72	1,179
Preston	17·42	1·0993	19·35	21·27	1,210
Leeds	17·28	1·1082	19·21	21·29	1,211
Bolton	16·90	1·1331	19·38	21·96	1,249
Birmingham	17·33	1·1050	20·00	22·10	1,257
Gateshead	17·83	1·0740	20·61	22·14	1,259
Wolverhampton	18·30	1·0464	21·27	22·26	1,266
Sheffield	17·22	1·1120	20·24	22·51	1,280
Newcastle	17·58	1·0892	21·42	23·33	1,327
Sunderland	18·25	1·0493	22·63	23·75	1,351
Manchester	16·90	1·1331	21·89	24·80	1,411
Salford	17·03	1·1244	22·70	25·52	1,452
Liverpool	17·44	1·0980	23·98	26·33	1,498

Table 3, relating to groups of Civil Parishes in Manchester, permits us to compare for these the actual death-rates, and also to compare the death-rates corrected for age constitution.

We find that in the parish of Cheetham and Crumpsall the actual death-rate is below that of England and Wales.

The population in Manchester is, however, in every sub-division younger than for England and Wales generally, and when we correct the death-rate to allow for this difference we find that, with the exception of Cheetham and Crumpsall, the Manchester parishes have in each case a mortality considerably exceeding that of the country generally.

The correction is, however, by no means just or satisfactory, since, as we have seen, the death-rate amongst young people approximates to that of England and Wales, while amongst older persons it very much exceeds that of the country generally. Hence the corrected death-rates are unduly high.

TABLE 3.—1898.—RECORDED AND CORRECTED DEATH-RATES PER 1,000 PERSONS LIVING IN GROUPS OF CIVIL PARISHES.

Groups of Civil Parishes in the Sub-Districts of Manchester, arranged in order of their corrected Death-rates	* Standard Death- rate	† Factor for correction for Sex and Age Dis- tribution	Recorded Death- rate, 1898	‡ Corrected Death- rate, 1898	§ Compar- ative Mortality Figure
Cheetham and Crumpsall	17·72	1·0807	14·25	15·23	867
Ardwick, Openshaw, } West Gorton, and } Rusholme	16·81	1·1374	19·11	21·74	1,237
Blackley and Harpurhey	17·16	1·1157	19·82	22·11	1,258
Chorlton-upon-Medlock.	16·29	1·1755	18·90	22·22	1,264
Newton Heath, Brad- } ford, Beswick, and } Kirkmanshulme ... }	17·08	1·1211	20·25	22·70	1,291
Moston	17·72	1·0807	21·07	22·77	1,296
Clayton	17·71	1·0815	22·62	24·46	1,392
Hulme	16·93	1·1309	22·86	25·85	1,470
St. George's	16·89	1·1340	25·25	28·64	1,629
Central	16·25	1·1782	24·91	29·35	1,670
Ancoats	16·83	1·1381	27·13	30·87	1,756
England and Wales ...	19·15	1,000	17·58	17·58	1,000

* The standard death-rate signifies the death-rate at all ages calculated on the hypothesis that the rates at each of twelve age periods in each town were the same as in England and Wales during the ten years 1881-90, the death-rate at all ages in England and Wales during that period having been 19·15 per 1,000.

† The factor for correction $\left\{ = \frac{19·15}{\text{Standard death-rate}} \right\}$ is the figure by which the recorded death-rate should be multiplied in order to correct for variations of sex and age distribution.

‡ The corrected death-rate is the recorded death-rate multiplied by the factor for correction.

§ The comparative mortality figure represents the corrected death-rate in each town compared with the recorded death-rate at all ages in England and Wales in 1898 taken as 1,000.

On reference to the Registrar-General's Annual Summary, we find that in respect of all the common zymotic diseases, with the exception of diarrhoea, the Manchester death-rate in 1898 was lower than that of the 33 large towns.

So great, however, was the excess of the diarrhoeal mortality that the total zymotic death-rate was considerably above that of the 33 large towns. This continuance of a high diarrhoea death-rate is an unfailing index that we have not yet been able to reach by our administrative methods the causes of infantile mortality. This is the fourth year in succession in which the death-rate from diarrhoea has been in excess, and the average death-rate of the last four years from this cause is higher than the average for any previous four years since 1875. So much effort has already been directed to this matter that one can only hope that the administrative efforts at amendment will more than counterbalance the retrogressive influences at work.

That in regard to diarrhoea there is not merely absolute but relative retrogression is shown by the number of towns having higher diarrhoea death-rates than Manchester. There were in 1891 eight, 1892 ten, 1893 ten, 1894 nine, 1895 four, 1896 six, 1897 ten, 1898 six.

The proportion of deaths occurring in public institutions was somewhat lower than in the previous year, being 19·5 per cent. as against 20·0 per cent. in 1897.

The particulars are exhibited in the following table, from which it appears that there is but little variation in the institutions, the principal exceptions being Monsall Hospital and the Workhouse.

The total number of deaths is less in 1898 than in any of the three previous years, being in 1898 2,236, in 1897 2,402, in 1896 2,344, and in 1895 2,482.

The chief reductions occur in Monsall Hospital, where the number of deaths is 127, as against 160 in 1897, 238 in 1896, and 200 in 1895.

A very considerable diminution occurred also in the deaths at the Manchester Workhouse, where in 1898 the deaths numbered 787, as against 856 in 1897, 829 in 1896, and 982 in 1895.

The most notable increase is in the number of deaths at Ancoats Hospital.

TABLE 4.—POPULATIONS—DEATHS OF MANCHESTER RESIDENTS,
1898, IN PUBLIC INSTITUTIONS.

Township	NAME OF INSTITUTION	Population, 1891	Deaths, 1898
ANCOATS	Ancoats Hospital	64	102
	Workhouse Casual Wards (Tame Street).....	...	2
CENTRAL	Workhouse Casual Wards	167	4
	Royal Infirmary	260	295
	St. Mary's Hospital	27	14
	Lock Hospital	25	...
	Eye and Ear Hospital	7	2
	Alsop's Boys' Home.....	11	...
	St. Joseph's Girls' Home.....	17	...
	Chetham Hospital.....	100	...
	Mission Refuge (St. John's Parade)	8	...
	Consumption Hospital.....	...	...
ST. GEORGE'S ...	Children's Hospital (Gartside Street).....	...	...
	Girls' Home (Charter Street)	21	...
CHEETHAM ...	Her Majesty's Prison	922	5
	Boys' Refuge	185	...
	Girls' Friendly Society	18	..
	Clinical Hospital	36	64
CRUMPSALL ...	Manchester Workhouse	2,608	787
	Prestwich Workhouse	305	122
BLACKLEY	Manchester and Salford Reformatory	76	...
	Litchford Hall	152	7
	Well's House Convalescent Home.....	10	...
MOSTON	St. Mary's Home .....	...	1
	St. Joseph's Home	34	...
	St. Bridget's Orphanage	32	...
NEWTON.....	Monsall Hospital	185	127
	Little Sisters of the Poor (Culcheth Hall) ...	107	10
CLAYTON	Clayton Smallpox Hospital .....	...	...
ARDWICK	Industrial School	203	...
	Nicholls Hospital	100	...
OPENSHAW	Crossley's Home .....	...	10
RUSHOLME.....	St. Joseph's Girls' School	150	...
	St. Mary's Home	28	...
CHORLTON-ON-MEDLOCK	St. Joseph's Boys' School	413	2
	Royal Eye Hospital	59	...
	Little Sisters of the Poor (Plymouth Grove)...	182	27
	Casual Wards (All Saints)	21	...
	Southern Hospital	23	16
	Cancer Hospital	19	16
	Maternity Home	11	7
	Home for Young Girls.....	18	..
	Rylands' Orphanage.....	17	...
	Church Army Labour Home	20	...
HULME	Penitentiary	51	...
	Cavalry Barracks	404	1
	Boys' Home (Chester Road)	20	...
* OUTSIDE CITY.	Loretto Convent .....	...	1
	Withington Workhouse	1,375	541
	Pendlebury Hospital	50	26
	Prestwich Lunatic Asylum	755	38
	St. Anne's Home, Dunham Massey .....	...	9
TOTALS.....		9,296	2,236

* Proportion only.

DEATH-RATES AT GROUPS OF AGES.

Referring to Table K in the Appendix, we perceive that as compared with other recent years the infantile mortality is comparatively high, due chiefly to the excessive death-rate from diarrhœa.

On the other hand, on consulting Table M we find that the death-rate of children under five years of age is low compared with all recent years except 1894, and would be lower than in 1894 were it not for the high diarrhœal mortality.

The year 1898 shows the lowest death-rate of all recent years for this age in respect of lung disease, diseases of the brain, scarlet fever, diphtheria, and whooping cough.

At the age group 5-15 (school age), the death-rate is decidedly lower than in any recent year.

The diseases in which improvement is observed in 1898 are scarlet fever, diseases of the brain, diseases of the lungs, diseases of the digestive system.

Again, at ages 15 to 25 the death-rate is lower than in any recent year.

The diseases in respect of which improvement occurs are tubercular disease, brain diseases, disease of the heart, and disease of the lungs.

At ages 25 to 45 the death-rate is higher than in 1897, though lower than in other years since 1890. The advantage possessed by 1897 is made up of a number of small items under diseases of the brain, heart, lungs, digestive system, urinary system, and other diseases.

Nevertheless, 1898 shows at this age a lower death-rate than in any previous years in respect of tubercular disease.

TABLE 5.—ANNUAL RATES OF MORTALITY IN MANCHESTER IN THE YEAR 1898 AT TWELVE GROUPS OF AGES
AMONGST PERSONS, MALES AND FEMALES, COMPARED WITH THE AVERAGE RATE AT THOSE AGES IN MANCHESTER
1891-1897, AND ENGLAND AND WALES DURING THE DECENNIUM 1881-90.

	PERSONS			MALES			FEMALES		
	Manchester Average, 1891-1897	Manchester, 1898	England and Wales, 1881-90	Manchester Average, 1891-1897	Manchester, 1898	England and Wales, 1881-90	Manchester Average, 1891-1897	Manchester, 1898	England and Wales, 1881-90
All Ages	22.63	21.23	19.17	24.38	22.97	20.28	21.00	19.62	18.06
0—	78.58	73.67	56.77	84.30	79.86	61.59	72.99	67.61	51.95
5—	5.34	4.27	5.31	5.10	3.97	5.35	5.58	4.57	5.27
10—	2.81	2.30	3.04	3.00	2.12	2.96	2.63	2.48	3.11
15—	4.39	3.34	4.38	4.94	3.36	4.33	3.88	3.33	4.42
20—	5.39	4.99	5.64	5.96	5.09	5.73	4.89	4.90	5.54
25—	8.42	7.59	7.20	9.04	7.93	7.78	7.84	7.28	7.41
35—	15.70	15.55	11.51	17.83	17.17	12.41	13.68	14.01	10.61
45—	25.95	24.11	17.23	30.49	28.60	19.36	21.89	20.10	15.09
55—	48.43	48.15	31.57	54.45	58.61	34.69	43.56	39.69	28.45
65—	94.59	90.02	65.38	107.79	102.63	70.39	85.52	81.36	60.36
75—	204.28	198.88	138.88	227.82	221.45	147.14	190.31	185.49	130.62
85—	298.28	288.89	288.32	322.50	305.56	305.81	286.86	281.05	270.82

At ages 45-65, the death-rate in 1898 is lower than in any recent year except 1894. At this age, however, the advantage is not in respect of tubercular disease, in which a higher mortality is exhibited at this age in 1897 and 1898 than in other recent years. The mortality is, however, comparatively low in respect of lung disease and diseases of the digestive system.

At ages over 65, again the death-rate is low compared with that of recent years, excepting 1894.

Thus there is a general tendency to improvement manifested, especially in the earlier years of life, marred, however, by the excessive death-rate from diarrhoea.

From Table 5 (which is given on page 10), we are able to compare the death-rate at groups of ages with the corresponding rate for England and Wales during the years 1881-90.

From this we perceive that while in infancy and in mature life the Manchester death-rates for 1898 considerably exceed those of the country generally, between the ages of 5 and 25 the reverse is the case.

Over the average of the years 1891-97, however, this advantage largely disappears, although for females there is still an advantage at the ages of 10 to 25.

MAIN DIVISIONS OF THE CITY.

The main features observed in comparing the death-rates in the statistical divisions of the City do not differ much from year to year, and a brief recapitulation of these for 1898 may suffice, the more so that they are readily gathered from the tables.

The following table enables us to compare the incidence of a few of the principal diseases on the three chief divisions of the City.

TABLE 6.—AVERAGE ANNUAL RATES OF MORTALITY FROM CERTAIN
COMPARED

STATISTICAL DIVISIONS		Scarlet Fever		Enteric Fever		Phthisis	
		1891-7	1898	1891-7	1898	1891-7	1898
City of Manchester.....		0·27	0·12	0·23	0·22	2·08	1·95
I. Manchester Township.....		0·30	0·11	0·24	0·25	3·11	3·02
II. North Manchester		0·28	0·12	0·21	0·24	1·29	1·33
III. South Manchester		0·25	0·12	0·23	0·19	1·88	1·69
I.	Ancoats	0·29	0·11	0·24	0·26	2·63	2·66
	Central	0·31	0·22	0·33	0·22	3·52	3·10
	St. George's	0·31	0·05	0·19	0·27	3·23	3·24
II.	Cheetham	0·20	0·10	0·11	0·22	1·22	1·28
	Crumpsall	0·20	...	0·13	...	1·03	0·61
	Blackley	0·22	...	0·19	0·25	1·03	2·08
	Harpurhey	0·29	0·24	0·21	0·24	1·14	1·20
	Moston	0·24	0·44	0·24	0·44	0·99	1·46
	Newton	0·32	0·08	0·28	0·24	1·55	1·44
	Bradford	0·34	0·13	0·26	0·30	1·33	1·54
	Beswick.....	0·37	0·18	0·25	0·27	1·27	1·09
	Clayton	0·23	0·24	0·15	0·24	1·26	0·71
III.	Ardwick.....	0·32	0·13	0·21	0·21	1·73	1·59
	Openshaw.....	0·23	0·09	0·27	0·31	1·16	0·84
	West Gorton.....	0·25	0·18	0·31	0·21	1·70	1·42
	Rusholme and Kirk.	0·15	0·15	0·18	0·10	1·09	1·26
	Chorlton-upon-Medlock ...	0·22	0·08	0·17	0·10	2·04	2·04
	Hulme	0·28	0·14	0·26	0·22	2·36	2·04

CAUSES IN DIVISIONS AND DISTRICTS, FOR THE 7 YEARS 1891-8
WITH 1898.

Nervous Diseases other than Convulsions		Circulatory System		Bronchitis		Pneumonia		Other Respiratory Diseases	
1891-7	1898	1891-7	1898	1891-7	1898	1891-7	1898	1891-7	1898
1·75	1·55	1·75	1·94	2·52	1·81	2·43	2·19	0·40	0·26
1·92	1·47	2·24	2·18	3·45	2·13	3·33	3·03	0·47	0·35
1·63	1·66	1·37	1·70	1·93	1·55	1·97	1·88	0·35	0·18
1·71	1·53	1·66	1·94	2·28	1·78	2·14	1·89	0·39	0·26
2·07	1·49	2·14	1·80	4·24	2·68	3·43	3·52	0·53	0·40
1·99	1·51	2·38	2·34	3·21	1·73	3·09	2·76	0·41	0·31
1·77	1·42	2·22	2·36	3·03	1·97	3·39	2·83	0·46	0·34
1·58	1·44	1·32	1·56	1·39	0·99	1·29	1·21	0·27	0·19
1·49	1·61	1·35	1·11	1·20	0·50	1·08	0·81	0·23	0·10
2·10	2·08	1·82	2·45	1·78	1·59	1·72	2·33	0·77	0·12
1·54	1·28	1·50	2·31	1·57	1·36	2·13	3·03	0·43	0·24
1·65	1·32	1·62	1·90	1·07	2·20	1·65	1·32	0·24	0·29
1·79	2·05	1·48	1·97	2·04	1·52	2·11	1·87	0·35	0·16
1·53	1·33	1·09	1·03	3·05	2·27	2·63	2·27	0·40	0·13
1·47	2·10	1·34	1·64	2·11	2·19	2·65	2·82	0·29	0·27
1·37	1·65	0·95	1·89	2·55	2·36	2·81	1·41	0·30	0·24
1·48	1·35	1·52	1·56	2·35	2·12	2·09	2·30	0·39	0·32
1·37	1·00	1·48	1·35	2·25	1·31	2·11	1·75	0·39	0·13
1·46	1·24	1·24	1·39	1·88	1·78	2·43	1·92	0·29	0·18
1·30	1·46	1·52	1·77	1·37	1·06	1·12	1·36	0·25	0·20
1·83	1·58	1·72	2·22	2·16	1·73	1·94	1·62	0·43	0·29
2·06	1·95	1·94	2·44	2·74	2·00	2·49	2·12	0·42	0·31

From this table we perceive that in respect of phthisis the Manchester Township has a death-rate much greater than that of South Manchester, while it is far more than double the death-rate of North Manchester from this cause. Moreover, although the discrepancy is not so great, the Manchester Township has a considerably higher death-rate from diseases of the circulation, from bronchitis, from pneumonia, and from other respiratory diseases than South Manchester ; and South Manchester has a higher death-rate from these causes than North Manchester. This is singular, and very noteworthy when we remember the number of large works to be found in North Manchester.

For nervous diseases this relation does not hold, nor does it hold in respect of scarlet fever.

Such difference as exists with regard to enteric fever is in the same direction.

Table K in the Appendix enables us to pursue our enquiry into some other important causes of death affecting infancy.

If we refer to such causes of death as measles, whooping cough, and other common infectious diseases, we perceive that no such relationship as that above mentioned is to be noted. The chief seat of incidence varies, in fact, from year to year for each of these.

The death-rates from diarrhœa, from wasting diseases, from suffocation, and of children found dead in bed, do, however, follow the same course. They do not own altogether the same causes.

Diarrhœa is produced by impurities in the food, and by careless and ignorant feeding applied to children often in an enfeebled state of health from previous neglect or carelessness. How far the impurities exist in the food when brought into the City and how far they are due to local causes is not easy to determine. It is, however, quite impossible to think that they are entirely due to imported impurities, irrespective of local conditions, or how could there be such constant and considerable differences? It is notable that South Manchester stands much closer to the Manchester Township in respect of diarrhœa than it does to North Manchester. The same is true of "wasting diseases."

This is not true as regards the causes "*suffocation and found dead in bed*," which are undoubtedly due largely to intemperance.

This table shows that for 1898 South Manchester has the highest infantile mortality from tubercular diseases, and also from convulsions, both the Manchester Township and the Southern Division being far in excess of North Manchester.

The excess of South Manchester over the Central Division of the City in respect of tuberculosis in infancy is considerable, and whatever be the explanation it is continued from year to year. When we consider the great excess of the tuberculosis death-rate in the Manchester Township at all ages, it is singular that this should be so strikingly reversed for infancy.

Table L enables us to satisfy ourselves that the higher death-rate of South Manchester from tubercular disease in infancy attaches to each of the groups *tabes mesenterica*, *hydrocephalus*, *phthisis*, and other forms of tuberculosis. It would appear that the tuberculous disease of infancy owns a different origin from that of adult life.

This preponderance of South Manchester is, however, confined to ages under 5. At the ages 5-15 the Manchester Township has already decidedly attained the highest death-rate from tubercular disease, and retains it with an increasing degree of difference at higher ages.

Table N in the Appendix, which deals with the mortality of the respective divisions at groups of ages, is deserving of careful study in other respects, although the main features of the table have already been considered.

At ages under 5 we perceive that whooping cough exacts a heavier mortality in the Manchester Township than in South Manchester, and in both than in North Manchester.

In previous reports I have expressed the conviction that the whooping cough mortality is in a very close relation to general sanitary conditions. The same relation is observable in every year since 1891 with one partial exception.

This would appear to point to isolation in hospital as very desirable for whooping cough at all events.

In order to illustrate this important point, I subjoin the death-rates at ages 0-5 in the three chief divisions of the City since 1891.

WHOOPING COUGH—ANNUAL DEATH-RATE 0-5 YEARS, 1891-98.

STATISTICAL DIVISION	1891	1892	1893	1894	1895	1896	1897	1898
Manchester Township...	9.53	6.54	4.93	4.19	5.51	7.06	5.16	3.20
North Manchester	5.37	4.36	1.99	3.44	2.64	3.57	2.21	1.00
South Manchester	8.09	5.36	3.51	4.72	3.01	4.72	5.11	2.86

Diphtheria and Membranous Croup, it will be seen, exact much the heavier mortality at ages 0-5 in North Manchester.

This, although the usual, is not an invariable relation.

Table H in the Appendix shows for the Chief Statistical Divisions of the City, and also for the Sub-divisions, the estimated populations, area and density of population, the birth-rate and death-rate.

As regards the density of population, taking into account the large number of warehouses and public institutions in the Manchester Township, the actual degree of crowding in rooms must be very much greater than in South Manchester. Nevertheless, taking account of this, the death-rate in the Manchester Township is in a very undue excess. The Manchester Township, it will be remembered, contains the Common Lodging-house element.

From Table J we perceive that the proportion of illegitimacy is much the highest in the Manchester Township, which is, however, nearer to that in South Manchester than the proportion in South Manchester is to that in North Manchester. These facts are in agreement with what we have seen from former reports, and this subject has been previously discussed.

Thus, not only is North Manchester less crowded than the other divisions of the City, but the amount of sexual immorality is less.

In each division, illegitimate children sustain a mortality more than double that of legitimate children.

Another useful table is Table 7, which is here inserted, showing the death-rate for each main division and sub-division of people dying in their own homes, in workhouses, and in hospitals.

TABLE 7.—1898.—DEATH RATES* IN THE HOMES OF THE PEOPLE,
IN WORKHOUSES, AND IN HOSPITALS FOR THE VARIOUS DIVISIONS OF
THE CITY.

STATISTICAL DIVISIONS	Estimated Popula- tions	Death-rate per 1,000 of persons dying in their own homes	Death-rate per 1,000 of persons dying in Work- houses	Death-rate per 1,000 of persons dying in Hospitals	Total death-rate per 1,000
City of Manchester ...	† 541,296	17·10	2·69	1·44	21·23
I. Manchester Township	145,208	18·24	5·40	2·12	25·76
II. Northern Districts ...	144,879	16·54	0·88	1·27	18·69
III. Southern Districts ...	251,209	16·77	2·17	1·15	20·09
I. { Ancoats Central St. George's	45,488 35,845 63,875	20·97 15·48 17·83	3·98 6·89 5·57	2·18 2·54 1·85	27·13 24·91 25·25
II. { Cheetham Crumpsall Blackley Harpurhey Moston Newton Heath Bradford Beswick Clayton	31,355 9,916 8,162 12,529 6,833 37,527 23,337 10,976 4,244	12·92 9·58 15·44 18·92 19·46 16·92 20·10 18·95 20·97	0·92 0·71 0·74 1·12 0·44 1·07 0·77 0·64 0·71	1·40 0·81 1·23 1·36 1·17 1·20 1·54 1·09 0·94	15·24 11·09 17·40 21·39 21·07 19·19 22·41 20·68 22·62
III. { Ardwick Openshaw West Gorton Rusholme and Kirk. Chorlton-on-Medlock Hulme	37,817 31,961 28,130 19,830 61,851 71,620	18·19 14·71 17·56 15·23 14·78 18·77	1·72 1·25 1·67 0·61 2·93 2·79	1·27 0·81 0·85 1·16 1·20 1·30	21·18 16·77 20·09 16·99 18·90 22·86

* In this table, *every death* occurring in a Public Institution has been referred to the District from which the patient originally came.

† Population estimated to middle of 1898.

Confining ourselves meantime to the main divisions of the City, we are struck with the enormous differences in the proportion of persons dying in the workhouse ; the Manchester Township yielding more than twice the number so dying from South Manchester, and more than six times the number from North Manchester. These figures reveal of themselves differences in the constitution of the population, which largely account for the great difference in the death-rates.

As regards the death-rate of persons who die at home, which may be taken to yield a fair idea of the sanitary conditions surrounding the normal element of a population, the Manchester Township still exhibits a decidedly higher rate, though much of the discrepancy is removed. It is further remarkable that there is very little difference between the death-rates of South and North Manchester for persons dying at home, a circumstance sufficiently notable if we consider the much greater density of population in South Manchester.

When, however, we refer to the Reports for 1895, 1896, and 1897, we find that the differences in the home death-rate are much more sharply marked in those years than in 1898, and more in accordance with what we should expect.

STATISTICAL SUB-DIVISIONS.

Any observations on these are subject to a considerable allowance for error. We are now near the end of a Census period, and unquestionably the populations in some of these, on which the rates are calculated, are widely different from the estimated populations. For all the more central sub-divisions, however, the figures may be taken as approximately correct.

Referring again to Table 7, which, as we have seen, gives for each Statistical Sub-division not only the general death-rate but also the home death-rate, the poverty death-rate, and the Institution death-rate, we find that the poverty death-rate is much higher in each sub-division of the Manchester Township than in any other sub-division. It is, however, far higher in Central and St. George's than in Ancoats, corresponding to the relative extent of the

common lodging-house element, while in five out of the six sub-divisions of South Manchester it is higher than in any of the nine sub-divisions of North Manchester.

In South Manchester it is highest in Chorlton-upon-Medlock and Hulme.

We have already seen that the death-rate at home is calculated to throw some light on the sanitary conditions surrounding the houses.

The highest death-rates at home are in Ancoats and Clayton. But the excess in Clayton is due to the population being considerably underestimated.

The next highest death-rates at home are in Bradford, Moston, Beswick, Harpurhey, Hulme, and Ardwick.

In regard to Beswick, Harpurhey, and Ardwick, however, the factor of increasing populations again intrudes.

The high death-rate of Moston is exceptional. On reference to Table 6, it will be seen that in 1898 this sub-division suffered unduly from diseases of the circulation and from respiratory disease.

It should be noted that in 1896 Bradford gave, after Ancoats, the highest home death-rate, while in 1897 it stood in nearly the same position.

There is no doubt that this sub-division suffers from exceptionally insanitary conditions.

It may, again, be mentioned that when a house-to-house record of sanitary conditions is kept, a record which would be of the greatest value, Bradford should be the first district surveyed.

INFECTIOUS DISEASES.

The diseases included in the Manchester Notification Act of 1881 are as follows: Smallpox, Scarlet Fever, Diphtheria, Typhus Fever, Enteric or Typhoid Fever, Relapsing Fever, Puerperal Fever, and Asiatic Cholera. Membranous Croup was added in 1892. The following cases were notified in 1898 and in the seven previous years, and the year 1898 is compared with the average of the previous seven years:—

	1891	1892	1893	1894	1895	1896	1897	Aver'ge for 7 Years	1898
Smallpox	2	118	607	282	51	1	0	152	...
Scarlet Fever	1,138	1,671	2,031	2,230	2,302	2,389	1,790	1,936	897
Diphtheria	456	497	622	512	402	239	150	411	196
Memb. Croup									
Typhus Fever	16	6	1	...	...	1	2	4	...
Enteric Fever	761	610	618	460	493	513	503	565	642
Relapsing Fever.....	4	...	...	...	...	...	...	1	...
Puerperal Fever.....	55	92	93	51	33	25	49	57	44
	2,432	2,994	3,972	3,535	3,281	3,168	2,494	3,126	1,779

The number of deaths for eight years from the more common diseases is shown in the following table, 1898 being compared with the average:—

From	1891	1892	1893	1894	1895	1896	1897	Aver'ge for 7 Years	1898
Measles	220	369	293	222	505	567	628	401	271
Scarlet Fever	114	139	140	116	173	198	124	143	65
Diphtheria	122	91	122	102	72	54	29	85	41
Memb. Croup	6	39	60	47	41	29	17	34	10
Enteric Fever	189	124	127	91	95	118	95	120	120
Smallpox	0	2	49	21	2	0	0	11	0
Influenza	347	140	120	45	194	53	107	144	64
Whooping Cough.....	518	368	240	286	250	359	299	331	170
	1,516	1,272	1,151	930	1,332	1,378	1,299	1,269	741

It will be seen on reference to the summary that the total number of cases of notifiable disease in 1898 was much below that of any previous year, and that the number of deaths from zymotic disease was also considerably below that of any of the years 1891-97.

Enteric fever, on the other hand, underwent a marked increase, and, unfortunately, the large number of overlooked cases cannot fail to have left the seeds for future propagation.

In order that we may thread our way among the intricacies of infectious disease in a large town, we require in the investigator, accuracy, interest, and intelligence. He must make a complete list of sanitary defects observed, and pick up all available information about the sources of infection. It is not a question of expenditure of time at all, but merely of intelligence and system.

The details recorded in the Inspector's report are scanned by the Medical Officer of Health, and annotated, and the action taken on the cases is followed by him to the end. The same work is done for measles and summer diarrhoea by the Chief Clerk. Thus in regard to defects observed there is no lack of precision.

Much experience of these reports, however, enables the Medical Officer of Health readily to see when the work is being perfunctorily or carelessly done.

The conclusion to which I have been driven is that such perfunctoriness is apt to ensue whenever a strict supervision of the cases is relaxed, and this it is, at present, impossible adequately to maintain.

Speaking generally, the reports bear internal evidence of being, on the average, less reliable in 1898 than in 1896 or 1897. Reports on cases of fever are of very little value unless a defective report is quite the exception.

The frequent changes in the staff have, no doubt, something to do with this. A good Sanitary Inspector is not made in a day, add to which that, for a considerable time, his energies are largely consumed in learning to know his district.

Then, again, it is no doubt the case that the Inspectors have a great deal of work to do besides attending to cases of fever, though much of their work does and should arise from such cases.

The work carried out in connection with these cases by the House Drainage Department is, I believe, of excellent quality, and a substantial improvement is being made in the condition of the City in consequence.

SCARLET FEVER.

The following are the tables relating to Scarlet Fever during the year 1898:—

SCARLET FEVER. ATTACKS IN WEEKS ACCORDING TO DATE OF RASH.

FIRST QUARTER			SECOND QUARTER			THIRD QUARTER			FOURTH QUARTER		
Jan.	8	36	April	9	17	July	9	12	Oct.	8	6
„	15	25	„	16	17	„	16	12	„	15	15
„	22	25	„	23	14	„	23	8	„	22	21
„	29	18	„	30	19	„	30	17	„	29	14
Feb.	5	30	May	7	20	Aug.	6	2	Nov.	5	12
„	12	18	„	14	13	„	13	21	„	12	21
„	19	31	„	21	25	„	20	12	„	19	12
„	26	25	„	28	23	„	27	9	„	26	9
Mch.	5	36	June	4	7	Sept.	3	14	Dec.	3	22
„	12	26	„	11	4	„	10	18	„	10	11
„	19	37	„	18	12	„	17	17	„	17	18
„	26	17	„	25	17	„	24	10	„	24	17
April	2	21	July	2	12	Oct.	1	12	„	31	10
Total... 345			Total... 200			Total... 164			Total... 188		

City Total, 897.

SCARLET FEVER ATTACKS.—RATES PER 1,000 LIVING, COMPARED WITH MEAN OF FIVE YEARS.

	1893	1894	1895	1896	1897	Mean	1898
Twelve Notification Towns*...	5·19	4·23	3·40	4·77	3·87	4·29	3·51
City of Manchester	3·92	4·27	4·37	4·42	3·34	4·06	1·66
Manchester Township	2·45	3·77	4·23	3·48	3·58	3·50	1·16
North Manchester	5·14	5·02	4·24	4·25	3·67	4·46	1·77
South Manchester	4·16	4·16	4·52	5·08	3·01	4·19	1·88

* These are Blackburn, Bolton, Bradford, Burnley, Huddersfield, Hull, Leeds, Liverpool, Oldham, Preston, Salford, and Sheffield.

SCARLET FEVER ATTACKS IN DISTRICTS, WITH ATTACK RATE, CASE
FATALITY PER CENT., AND REMOVALS TO HOSPITAL PER CENT.

DISTRICTS	ATTACKS	ATTACK RATE PER 1,000 LIVING	† CASE FATALITY PER CENT.	REMOVALS TO HOSPITAL PER CENT.
Ancoats	57	1·25	3·5	91·2
Central	64	1·79	10·9	85·9
St. George's	48	0·75	4·2	79·2
Cheetham	91	2·90	3·3	71·5
Crumpsall	23	2·32	...	65·2
Blackley	4	0·49	...	25·0
Harpurhey	26	2·08	11·5	53·8
Moston	17	2·49	17·6	64·7
Newton Heath.....	37	0·99	8·1	73·0
Bradford	34	1·46	8·8	79·4
Beswick	19	1·73	5·3	78·9
Clayton	5	1·18	20·0	60·0
Ardwick	76	2·01	6·6	77·6
Openshaw.....	72	2·25	4·2	65·3
Gorton (West)	79	2·81	7·6	69·6
Rusholme and Kirk.	61	3·08	4·9	62·3
Chorlton-on-Medlock.	74	1·20	5·4	66·2
Hulme	110	1·54	9·1	77·4
City of Manchester	897	1·66	6·6	73·1

† Corrected : the fatal cases are those actually occurring amongst the cases notified.

SCARLET FEVER.

Number of attacks, of deaths, and case fatality per cent. at different ages :—

AGES	ATTACKS	DEATHS	CASE FATALITY PER CENT.
Under one year.....	13	4	30·8
1 to 2 years	39	7	18·0
2 to 3 „	74	11	14·9
3 to 4 „	98	13	13·3
4 to 5 „	107	5	4·7
5 to 6 „	104	3	2·9
6 to 7 „	85	5	5·9
7 to 8 „	74	2	2·7
8 to 9 „	53	1	1·9
9 to 10 „	46	2	4·3
10 to 15 „	115	2	1·7
15 to 20 „	44	3	6·8
20 to 25 „	28	1	3·6
25 to 35 „	16	...	...
35 to 45 „ .....	...	...	...
Over 45 „	1	...	...
All ages.....	897	59	6·6

SCARLET FEVER, 1891-1898.

Number of attacks, of deaths, and case fatality per cent. at different ages :—

AGES	ATTACKS	DEATHS	CASE FATALITY PER CENT.
Under one year.....	214	48	22·9
1 to 2 years	645	131	20·3
2 to 3 „	1,182	185	15·7
3 to 4 „	1,518	201	13·2
4 to 5 „	1,578	147	9·3
5 to 6 „	1,545	99	6·4
6 to 7 „	1,347	68	5·1
7 to 8 „	1,197	45	3·8
8 to 9 „	949	25	2·6
9 to 10 „	758	20	2·6
10 to 15 „	2,161	42	1·9
15 to 20 „	691	22	3·2
20 to 25 „	314	10	3·2
25 to 35 „	250	5	2·0
35 to 45 „	72	3	4·2
Over 45 „	27	1	3·7
All ages.....	14,448	1,052	7·3

SCARLET FEVER MORTALITY.—RATE PER 1,000 LIVING, COMPARED
WITH MEAN OF FIVE YEARS.

	1893	1894	1895	1896	1897	Mean	1898
England and Wales.....	0·24	0·17	0·15	0·18	0·15	0·18	0·11
33 Great Towns	0·29	0·21	0·18	0·22	0·18	0·22	0·14
London.....	0·37	0·22	0·19	0·21	0·18	0·23	0·13
Manchester City	0·27	0·22	0·33	0·37	0·23	0·28	0·12
Manchester Township	0·23	0·26	0·37	0·41	0·27	0·31	0·11
North Manchester	0·39	0·18	0·24	0·24	0·29	0·27	0·12
South Manchester	0·23	0·22	0·35	0·41	0·17	0·28	0·12
67 Smaller Towns	0·20	0·16	0·16	0·20	0·15	0·17	0·10
Rural Districts.....	0·20	0·14	0·12	0·14	0·12	0·14	0·09

The above tables show a number of facts in connection with scarlet fever in continuation of the tables in previous Annual Reports. It will be seen that the number of cases reported in 1898 is less than the average of the previous seven years. On looking at the numbers notified in each of these years we perceive that in 1898 we had reached the trough of a wave of which the top covered the years 1895, 1896, and 1897, while 1891 was on the advancing side.

Comparing the percentage to the population of scarlet fever cases reported in 1898 with the percentages notified in the 12 notification towns, we perceive that the percentage in Manchester was less than half that for the twelve towns.

As regards the scarlatinal death rate, it was not appreciably higher than that of England and Wales, which reached an unprecedented point of depression, and it was below that of London and of the 33 great towns, a condition of affairs most unusual for this City.

The great diminution in scarlet fever was, however, not confined to Manchester, but was manifested equally in the larger towns, the smaller towns and the rural districts, from which circumstance it would appear that this disease is governed largely by conditions which we may call meteorological

for want of a better term. If we refer to the table of scarlet fever mortalities in successive years, we perceive that there is a general correspondence between the rise and fall in Manchester and the rise and fall in the country generally, and in the 33 large towns, quite marked, indeed, but not very close.

The same thing is to be noted in the table showing the fluctuations in the Manchester mortality from enteric fever, as well as in that of the country generally, and to very much the same extent as in the case of scarlet fever.

It is also manifest in the mortality from summer diarrhœa, but here the correspondence between Manchester and the rest of the country is remarkably close.

Attention has already been drawn to the similarity in the seasonal fluctuations of these three diseases, and it has been suggested that all three are determined by conditions connected with the growth of the respective bacteria in the soil.

It is not to be expected, however, on this supposition that the correspondence in the rise and fall of the mortality would be equally close in the three diseases.

There is no circumstance known to us about summer diarrhœa which would interfere with seasonal influence, except perhaps the presumed growth of the specific organisms in milk, a factor itself under the influence of temperature, and subject to a general and uniform amount of influence.

Enteric fever is largely influenced by notification, isolation, direct infection, milk outbreaks, water diffusion, diffusion by oysters, and other perturbing influences.

In the case of scarlet fever direct infection is such a large factor as to be liable to conceal the others.

Nevertheless, as we see, a general correspondence does hold between Manchester and the country generally in respect of those two diseases. If,

however, this be so, the surmise that the annual wave of scarlet fever is strikingly influenced by conditions of the soil, and therefore by the condition of the closets, just as enteric fever is, should be susceptible of the same species of inquiry.

It must be remembered, at the same time, that any such influence of the closets would be likely to be exerted with a defective condition of the pail closets to a larger extent than in the case of enteric fever, where an overflow of urine may be supposed to have less influence. However, these considerations should, perhaps, follow rather than precede the facts.

In 1898, as we see, the attack rate from scarlet fever is lowest in the Manchester Township, and is somewhat lower in North Manchester than in South Manchester.

Referring to previous years, we find that with the exception of 1897, in which the attack rate was lowest in South Manchester, the attack rate has been lowest in the Manchester Township.

There is no such relation in the death rates. Whether the higher mortality of the Manchester Township cases be due to a number of the milder cases not being reported, which is unlikely, or to the feebler stamina of the Manchester Township children, which is the more probable explanation, I cannot at present say.

Adopting, however, the attack rate, we are in a position, by aid of the table of attack rates in the 18 Sanitary Districts, to compare the different parts of the City. Having regard to the influence of the soil and of closets, we may get some idea of the degree of persistence of scarlet fever in different districts, and of the parts of the City where it is firmly established, by writing down, in order, for each year, the eight districts in which the attack rate has been highest, beginning with that in which the attack rate is absolutely heaviest.

Doing so, we get the following statement from 1891 to 1898 of the eight districts in each year giving the heaviest scarlatinal attack rates:—

1891	Newton	Beswick	Blackley	Openshaw	Cheetham	Crumpsall	Harpurhey	West Gorton
1892								
1893								
1894	Harpurhey	Cheetham	Newton	Clayton	Chorlton-on-Medlock	Openshaw	Bradford	St. George's
1895	Ardwick	Beswick	Cheetham	St. George's	West Gorton	Hulme	Crumpsall	Clayton
1896	Moston	Hulme	Beswick	Chorlton-on-Medlock	Clayton	Ardwick	Newton	Cheetham
1897	Cheetham	Central	Ancoats	Clayton	Bradford	Openshaw	Chorlton-on-Medlock	Ardwick
1898	Rusholme	Cheetham	West Gorton	Moston	Crumpsall	Openshaw	Harpurhey	Ardwick

In this list, Cheetham appears 6 times ; Ardwick, Clayton, and Openshaw appear 4 times ; Beswick, Chorlton-on-Medlock, Crumpsall, Harpurhey, Newton Heath, and West Gorton appear 3 times.

Thus, strangely enough, the districts come out in much the same way as they do in the case of enteric fever, the more outlying districts, which are pre-eminently midden districts, being those which have the greatest tendency to a recurrence of a high scarlet fever attack rate.

Reasons are given under “Enteric Fever” why, assuming the disease to be propagated in and communicated from a contaminated soil, the above mode of enquiry should be preferred to a scrutiny of individual houses.

At the same time, this mode of investigation is liable to the drawback that each class of infectious disease has its preferential age distribution. In the

case of enteric fever this is not of so much moment ; but for scarlet fever, and in a lesser degree for diphtheria, in which disease the chief incidence is on childhood, it is necessary in some way to take this into account. The best way if we could obtain accurate populations at groups of ages for each district would be to reckon the death-rates from scarlet fever under ten years of age on the population living at those ages. A readier, if less satisfactory, method presents itself by taking out the differences between the birth-rates and death-rates for each district in successive years, and writing down in order the highest differences. When we do this, as in the following table, we find that these differences, which are the natural increases of the populations, differ very widely. They do not exactly represent the order in which children susceptible to scarlet fever are proportionately most numerous, since the districts having a high adult mortality are in this way unduly depressed. But, generally speaking, they form an approximate index to the districts having the greatest amount of susceptible material.

TABLE SHOWING THE EIGHT DISTRICTS FOR EACH YEAR SINCE 1891 HAVING THE GREATEST NATURAL INCREASE OF POPULATION.								
1891	Beswick	Harpurhey	Cheetham	West Gorton	Clayton	Openshaw	Moston	Bradford
1892	Beswick	Bradford	Openshaw	West Gorton	Cheetham	Harpurhey	Clayton	Moston
1893	Beswick	Cheetham	West Gorton	Ardwick	Newton	Bradford	Openshaw	Harpurhey
1894	Beswick	Cheetham	Bradford	Openshaw	West Gorton	Clayton	Harpurhey	Moston
1895	Cheetham	West Gorton	Beswick	Moston	Harpurhey	Openshaw	Clayton	Bradford
1896	Beswick	Cheetham	Moston	West Gorton	Ardwick	Harpurhey	Clayton	Bradford
1897	Harpurhey	Beswick	Bradford	Cheetham	Moston	Ardwick	West Gorton	Openshaw
1898	Clayton	Cheetham	Harpurhey	Moston	Ardwick	Beswick	West Gorton	Bradford

The districts appearing on this list are :—

Eight times—Cheetham, Harpurhey, Beswick, West Gorton, and Bradford.

Seven times—Moston.

Six times—Clayton and Openshaw.

Four times—Ardwick.

Ten out of 17 districts have been mentioned in which scarlet fever appears with exceptional persistence. The above nine districts, with the exception of Moston and Bradford, appear in the list of 11 districts having the greatest persistence of scarlet fever, which also includes Crumpsall, Newton Heath, and Chorlton-upon-Medlock.

The general effect is to show that the proportion of children in a district has decidedly to do with the attack rate of scarlet fever in the district, and that this connection should prevent a too secure generalization as to other connections.

As regards the connection between the cases of scarlet fever and the class of closet used at the house of the patient, the facts for 1898, which are given only for untraced cases, are as follows :—

CASES NOT TRACED.

Pail Adjoins			Pail within Four Feet			Pail Four Feet and Over		
Guide not defective	Guide defective	Other-wise defective	Guide not defective	Guide defective	Other-wise defective	Guide not defective	Guide defective	Other-wise defective
191	9	10	20	2	1	135	11	4

Midden			Water-closets
Adjoins	Within 6 feet	Six feet and over	
36	32	56	
			110

DOUBTFULLY TRACED CASES.

Pail Adjoins			Pail within Four Feet			Pail Four Feet and Over		
Guide not defective	Guide defective	Other-wise defective	Guide not defective	Guide defective	Other-wise defective	Guide not defective	Guide defective	Other-wise defective
24	0	3	1	0	0	30	4	0

Midden			Water-closets
Adjoins	Within 6 feet	Six feet and over	
3	4	24	
			18

These figures may be thus summarised :—

UNTRACED CASES.

Pails	Middens	Water-closets
383	124	110

DOUBTFULLY-TRACED CASES.

Pails	Middens	Water-closets
62	31	18

Taking the ratio of pails to middens at 3·5 to 1, these figures show a preponderance of middens which does not hold for the previous two years.

On referring to the Annual Report for 1896, it will be seen that the number of pails with defective urine guides, leading to the soakage of the ground with urine, was very great ; while in 1898 it would seem, from the record, to be trifling. This change is due to the energetic action of the Sanitary and Cleansing Committees, which must be duly recorded, and which must have resulted in a considerable diminution of pollution of the soil in the pail closet districts.

It is well worth while inquiring whether the peculiar relation between pails and closets at different seasons of the year holds for scarlet fever as well as for enteric.

The chief points calling for attention in connection with this disease, besides its connection with the soil, are : the phenomenon of return cases from hospital, school infection, and the extent to which the disease has been traced to direct infection.

RETURN CASES IN CONNECTION WITH MONSALL HOSPITAL.

First, it may be remarked that the proportion of cases removed to hospital in 1898 is smaller than in 1897.

PERCENTAGE OF REMOVALS IN

1891—93	1894	1895	1896	1897	1898
59·2	66·0	71·3	73·9	79·7	73·1

The chief reason for this is, no doubt, that the patients have come more from outlying districts, and from a class of people better able to look after their children at home. It is also possible, at the same time, that the cessation of relations with Pendlebury Hospital has had some effect. There are always a number of people who think they have cause for dissatisfaction, and when subsequent attacks occur in their household will not send them into hospital, unless the hospital be a different one.

The great reduction in the number of return cases which has taken place in the last two years has, however, done much to counteract this influence. It will be remembered that the plan proposed for dealing with this influence was as follows :—

1. To isolate all cases for a period of a fortnight before discharge in special wards.

2. To inunct the patients with weak carbolic oil immediately before transference to the isolation ward, so as to fix the infection to the skin, and to wash out the nostrils.

3. To bathe them every alternate day, and immediately after the bath to re-inunct them.

4. To wash out the nostrils and ears with an antiseptic solution every day. This was done under the view that during the stay in an acute ward the convalescent patient, in the act of breathing, stores up in the nostril the infective matter discharged from acute cases, which he subsequently expels at home. In the phenomenon of return fever, the infection derived from the return case is thus regarded, not as emanating from his own disease, but as being merely conveyed, in his nostrils chiefly, from acute cases.

If, therefore, the nostrils and ears of the convalescent are washed with an antiseptic every day, the greater part of such infective matter should be removed or destroyed in the course of a fortnight.

5. The patients are encouraged to spend as much time outside as possible.

The expectation has been that if this treatment were adequately carried out return cases would become very rare. Unfortunately, the rapid increase in scarlet fever cases treated in the hospital in the end of 1897 and the early part of 1898 rendered the precautions for keeping infective matter out of the isolation wards abortive, with the result that a number of return cases occurred.

As, however, the disease diminished in the later part of 1898, a very unusual occurrence, the isolation wards could again be kept free from infective matter, and the cases could be put through all the precautions. The results are clearly shown by the following list of patients which gave rise to return cases occurring in 1898, and of the cases connected with their return home.

LIST OF PATIENTS DISCHARGED FROM CONVALESCENT WARDS.

Prog. No. of second case	Date of Eruption of second case.	Prog. No. of first case.	Date of Notification of first case.	Date of Eruption of first case.	Date of removal to Hospital.	Date of return home.	Interval between return and eruption in second case.	Contracted at		Complications of first case during stays in Hospital.	Condition of first case when discharged as stated by the relatives.
								Home.	Another House.		
							Days				
17	Jan. 3	1279	Oct. 16	Oct. 16	Oct. 16	Dec. 28	7		†	Nil	Nothing observed
42	Jan. 4	1380	Oct. 30	Oct. 29	Oct. 30	Dec. 31	5	†		Nil	Nothing observed
71	Jan. 16	1344	Oct. 26	Oct. 24	Oct. 26	Dec. 17	31	†		Adenitis	Nothing observed
256	Mar. 4	1566	Nov. 22	Nov. 22	Nov. 22	Jan. 25	39	†		Album. Otitis (double)	?
262	Mar. 8	1759	Dec. 27	Dec. 26	Dec. 27	Feb. 25	12	†		Album.	Nothing observed
268	Mar. 8	1735	Dec. 22	Dec. 22	Dec. 22	Mar. 1	8	†		Nephritis	Nasal discharge
294	Mar. 14	1570	Nov. 23	Nov. 21	Nov. 23	Mar. 1	14		†	Album. Otitis (R.)	?
334	Mar. 27	1	Jan. 3	Jan. 1	Jan. 3	Mar. 8	20	†		Nephritis	Nothing observed
345	Mar. 29	90	Jan. 20	Jan. 18	Jan. 20	Mar. 18	12	†		Album.	Nasal discharge
389	Apl. 13	130	Feb. 2	Feb. 2	Feb. 2	Apl. 1	13	†		Sc. Anginosa Album.	Slight desquamation
404	Apl. 19	219	Feb. 25	Feb. 25	Feb. 25	Apl. 15	5	†		Hæm. Neph. Pneumonia	Slight discharge from ear
411	Apl. 21	1769	Dec. 28	Dec. 27	Dec. 28	Mar. 8	45	†		Nil	Nothing observed
582	June 30	276	Mar. 11	Mar. 11	Mar. 11	June 7	24	†		Rhinitis (slight)	Nothing observed
634	Aug 9	453	May 9	May 9	May 9	Aug. 8	2		†	Rhinitis	Nothing observed

LIST OF PATIENTS DISCHARGED FROM ACUTE WARDS.

Prog. No. of second case.	Date of Eruption of second case.	Prog. No. of first case.	Date of Notification of first case.	Date of Eruption of first case.	Date of removal to Hospital.	Date of return home.	Interval between return and eruption in second case.	Contracted at		Complications of first case during stay in Hospital.	Condition of first case when discharged.
								Home.	Another House.		
							Days				
28	Jan. 5	1407	Nov. 3	Nov. 2	Nov. 4	Dec. 31	5	†		Nephritis	Nothing observed
70	Jan. 14	1386	Nov. 1	Oct. 26	Nov. 1	Jan. 11	3	†		Nephritis Adenitis	?
99	Jan. 20	1419	Nov. 5	Nov. 4	Nov. 5	Jan. 11	9		†	Otitis (L.) Album.	?
95	Jan. 21	1505	Nov. 16	Nov. 5	Nov. 16	Jan. 14	7	†		Nephritis	Nothing observed
215	Feb. 23	1703	Dec. 16	Dec. 15	Dec. 16	Feb. 8	15	†		Nil	Discharge from left ear
232	Feb. 24	1424	Nov. 6	Nov. 6	Nov. 6	Feb. 18	6	†		Hæm. Neph. Supp. Aden.	Nothing observed
350	Mar. 31	56	Jan. 13	Jan. 11	Jan. 14	Mar. 22	9	†		Album.	Discharging crack, right ear
487	May 19	153	Feb. 8	Feb. 7	Feb. 8	Mar. 29	52	†		Nil	Desquamated after return
453	May 9	306	Mar. 18	Mar. 17	Mar. 18	May 3	6		†	Nil	Nothing observed
833	Nov. 11	706	Sep. 15	Aug. 27	Sep. 15	Nov. 1	10	†		Nil	?

Now, out of the total 25 return cases occurring in 1898, 4 were connected with cases discharged in 1897, while 1 case in 1897 was connected with a case discharged in 1896. No case in 1899 was due to a case discharged in 1898. Hence, adding 4 to the 23 return cases for 1897, and deducting 1 due to 1896, we get 26 connected with 1,238 discharges in 1897, and 21 connected with 836 discharges in 1898. The proportion is therefore greater in 1898 than in 1897.

If, however, we remove the cases with a latent period exceeding 14 days, we get as due to 836 discharges in 1898 15 cases, and to 1,238 discharges in 1897 18 cases.

I do not believe, however, that the period of 14 days is sufficient, and, therefore, not much value is to be attached to this modification.

The apparent increase in 1898 is entirely illusory, so far as I can judge. During the last three months of 1897 and the first three months of 1898 an overflow of scarlet fever occurred, the so-called convalescent wards became practically acute wards, and the precautions which I consider necessary by way of cleansing the cavities were not carried out. On the other hand, there was no shortening of the stay in the hospital. The pressure of cases relaxed, according to Dr. Marsden, about March 28, but it was probably some time after that before the precautions against return were strictly carried out.

It will be remembered that the presumed remarkable success of these precautions was during the early part of 1897, when the precautions were carried out. It may be assumed that early in the period April-June, 1898, these operations were again in full force, and it will be seen from the table that the return phenomenon had practically ceased at the end of April. The relation is clearly seen from these figures :—

Return cases admitted—	January-March, 1898...	...	...	17
„	„ April-June	...	...	6
„	„ July-September	...	...	1
„	„ October-December	...	...	1
Cases discharged —	January-March, 1898...	...	...	378
„	„ April-June	...	...	216
„	„ July-September	...	...	126
„	„ October-December	...	...	116

Of those admitted in the first quarter, three do not fulfil the condition that the period between discharge and admission shall not exceed 14 days.

Of the six admitted April-June, three do not even approximately fulfil this condition. In the one admitted July-September, the interval is too short. We may thus say that when the proper conditions had been completely restored, and the isolation wards been rendered again free from infection, only one case

fulfilling the conditions of a return case occurred after the middle of May. To any one who will dispassionately study the particulars given in the Manchester Annual Reports for 1896, 1897, and 1898, it must, I think, appear proved that the theory of occlusion of infection from acute cases in the nostrils of convalescent cases, and perhaps in other cavities about the face, accounts for the facts of "return" scarlet fever, and, further, that the procedure founded on that hypothesis is sufficient to meet the difficulty when carried out with reasonable care.

It will be seen that the table is divided into two parts: relating to patients discharged from the so-called convalescent wards, and from wards containing acute cases respectively, the first numbering 15, and the second 10. The latter stand on precisely the same footing as return cases previous to the commencement of our operations. Nevertheless, the substantial number of 15 remains having relation to the convalescent wards. The 10 cases from acute wards stand in relation to 344 discharged direct from these wards, while the 15 from convalescent wards relate to 492 cases discharged from these wards. The respective percentages are 2·9 per cent. and 3·0 per cent. No inference whatever can be drawn from these numbers, for the reasons which I have already given.

SCHOOL INFECTION.

The subject of infection in school is one of some importance, and it is one which has excited considerable attention. In the Report for 1897, facts were given which seemed to show that scarlet fever spreads in school, but not readily. The disease would seem not to be most infectious at its very inception, and, owing to the marked onset of this disease, it is at this period that the child attacked is removed from school.

When, however, it does begin to spread, it seems to do so in a slow but tenacious manner.

It may be confined to one department for a long period without showing any tendency to extension to another department under the same roof. Its power of aërial extension would appear to be slight.

In order to illustrate the habit of the disease in school, I give full particulars for 1898 in regard to all schools in which any evidence of diffusion existed.

In determining the influence of a school in spreading the disease, we shall adhere to the standard adopted in 1898, namely, that untraced cases must not be separated by an interval between the attacks of more than two

months, and that for the inference of probable diffusion in school to be drawn they must be in the same department. The facts are these :—

No. on School Register, 1 :—

Date of Eruption	Age	Sex	Department	Date of Eruption	Age	Sex	Department
Jan. 1	5	f.	Infants	Oct. 24	4	f.	Infants
March 27	3	m.	Infants	Oct. 24	10	f.	Girls
Aug. 31	6	m.	Boys	Nov. 6	8	f.	Girls
Sept. 4	6	f.	Girls	Dec. 4.....	7	m.	Boys
Oct. 16	10	m.	Boys	Dec. 7.....	5	f.	Infants
Oct. 23	6	f.	Girls	Dec. 26	9	f.	Girls
Oct. 19	7	f.	Girls				

It would appear that in this school the disease underwent some diffusion in the girls' department, but did not extend to the boys or infants.

No. on School Register, 27 :—

Date of Eruption	Age	Sex	Department	Date of Eruption	Age	Sex	Department
Jan. 6	11	m.	Boys	May 5.....	7	f.	Girls
Jan. 17	8	m.	Boys	June 26	8	m.	Boys
Jan. 16	9	m.	Boys	June 25	7	f.	Girls
Feb. 1.....	10	m.	Boys	June 26	5	f.	Infants
Feb. 2.....	8	m.	Boys	July 7	7	f.	Girls
Feb. 9.....	4	m.	Infants	July 11	5	m.	Infants
Feb. 18	6	m.	Infants	July 31	6	m.	Infants
March 10	7	f.	Girls	Sept. 7	7	f.	Infants
March 11	7	m.	Infants	Dec. 26	15	m.	Boys
				Dec. 27	7	m.	Infants

This school was the subject of special comment, as No. xviii. in the Annual Report for 1897, page 34. In that year it was noted that diffusion had taken place exclusively amongst the infants and girls, and had not assailed the boys' department. The girls and infants have a common playground and closets, the boys having these separate. In 1898 the condition of affairs is reversed. Diffusion occurs amongst the boys in January and February, 1898, while a careful study of the details makes it doubtful whether any other diffusion took place in school in that year.

No. on School Register, 19 :—

Date of Eruption	Age	Sex	Department	Date of Eruption	Age	Sex	Department
Jan. 2	7	m.	Infants	May 22	6	m.	Infants
Jan. 3	8	f.	Girls	May 23	8	m.	Boys
Feb. 13	7	f.	Girls	July 26.....	7	m.	Boys
Mar. 17.....	11	m.	Boys	Sept. 17.....	4	m.	Infants
Apl. 16.....	9	m.	Boys	Oct. 17	4	f.	Infants
May 18	5	m.	Infants	Dec. 6.....	4	m.	Infants

It seems not unlikely, having regard to the fact that no other source of these cases could be ascertained, that diffusion occurred amongst the boys

and infants in this school, although, if present, it must have been of low intensity. The dates, however, inspire doubt on the subject.

No. on School Register, 59 :—

Date of Eruption	Age	Sex	Department	Date of Eruption	Age	Sex	Department
Jan. 14.....	5	f.	Infants	July 9	6	f.	Infants
Feb. 18	4	f.	Infants	July 30.....	6	m.	Mixed
Feb. 26.....	10	f.	Mixed	Sept. 5	7	m.	Infants
Feb. 28.....	4	f.	Infants	Sept. 6	7	m.	Infants
Feb. 27.....	6	f.	Infants	Aug. 13	6	f.	Infants
Mar. 17	7	m.	Infants	Nov. 4.....	9	m.	Mixed
Mar. 27	5	m.	Infants	Oct. 29	8	f.	Infants
Apl. 4	10	m.	Mixed	Nov. 7	9	f.	Mixed
May 9	7	m.	Infants	Dec. 2	6	f.	Infants

It would appear that diffusion took place amongst the infants at this school both in the early and latter parts of the year, but was more marked in the end of the year than in the beginning. No diffusion can be affirmed to have occurred in the mixed department.

No. on School Register, 63 :—

Date of Eruption	Age	Sex	Department	Date of Eruption	Age	Sex	Department
Jan. 6	4	f.	Infants	Nov. 26	7	f.	Girls
Jan. 17	11	f.	Girls	Nov. 30	9	m.	Boys
Feb. 3	5	m.	Infants	Dec. 3.....	5	m.	Infants
Sep. 1.....	5	m.	Infants	Dec. 10	5	f.	Infants
Oct. 18.....	10	m.	Boys	Dec. 12	4	f.	Infants

This is the School ii. on which special comment was made in the Report for 1897. The disease was practically confined to the girls and infants, the boys escaping. The girls and infants have a common playground and closets. Yet the disease was for a considerable time limited to the girls' department, though ultimately it spread to the infants' department. It seemed to have a tendency to be limited even to particular parts of the class-room. In 1898 there was apparently slight diffusion amongst the infants both at the beginning and end of the year, but none amongst the girls.

No. on School Register, 67 :—

Date of Eruption	Age	Sex	Department	Date of Eruption	Age	Sex	Department
Jan. 10	6	f.	Infants	March 28	8	m.	Mixed
Feb 20	6	m.	Infants	April 3	5	f.	Infants
March 18	6	f.	Infants	April 10	7	f.	Infants

Here there was diffusion in the infants' department in the early part of the year.

No. on School Register 75 :—

Date of Eruption	Age	Sex	Department	Date of Eruption	Age	Sex	Department
Jan. 14	6	m.	Infants	May 27	5	f.	Infants
Feb. 17	5	m.	Infants	July 9	4	f.	Infants
				Sep. 29	7	m.	Infants

This school does not comply with the conditions justifying suspicion of diffusion, yet the facts are curious, and suggest that the time limit may be too strict. They are, therefore, set down.

No. on School Register, 81 :—

Date of Eruption	Age	Sex	Department	Date of Eruption	Age	Sex	Department
Jan. 20	5	f.	Infants	May 28	8	f.	Girls
Apl. 13	5	f.	Infants	June 17	6	f.	Infants
May 5	7	f.	Infants	June 17	5	f.	Infants
May 19	6	f.	Infants	July 25	12	f.	Girls
May 23	10	f.	Girls	Oct. 16	7	m.	Girls
May 25	7	f.	Girls	Oct. 19	6	f.	Infants
May 26	7	f.	Girls	Nov. 7	4	f.	Infants
May 25	4	f.	Infants	Nov. 16	7	m.	Boys
May 27	5	m.	Infants				

Here there is slight evidence of diffusion in May amongst the infants. A study of the facts will show that there is no evidence of other diffusion.

No. on School Register, 87 :—

Date of Eruption	Age	Sex	Department	Date of Eruption	Age	Sex	Department
Jan. 26	10	f.	Girls	Apl. 23	4	f.	Infants
Jan. 31	9	m.	Boys	May 7	6	m.	Infants
Feb. 3	9	m.	Boys	Sep. 10	11	f.	Girls
Feb. 18	6	m.	Infants	Sep. 7	5	m.	Infants
Mar. 3	10	m.	Boys	Sep. 16	3	m.	Infants
Apl. 4	5	m.	Infants	Sep. 25	5	f.	Infants
Apl. 17	7	m.	Boys				

There is reason to suppose that diffusion occurred amongst the infants in the early part of the year, and perhaps after the holidays to a very slight extent.

No. on School Register, 93 :—

Date of Eruption	Age	Sex	Department	Date of Eruption	Age	Sex	Department
Feb. 2.....	5	f.	Infants	May 27	6	f.	Infants
March 30	10	f.	Mixed	July 1	5	f.	Infants
April 2	4	m.	Infants	July 14	9	m.	Mixed
May 18	5	f.	Infants	July 17	3	m.	Infants
May 20	5	m.	Infants	Aug. 31	7	f.	Mixed
May 22	8	m.	Mixed	Sept. 12	5	m.	Mixed

Diffusion occurred to a slight extent amongst the infants in the early part of the year.

No. on School Register, 97 :—

Date of Eruption	Age	Sex	Department	Date of Eruption	Age	Sex	Department
Jan. 29	4	f.	Infants	Aug. 13	10	f.	Senior Mixed
Feb. 14	8	f.	Junior Mixed	Aug. 21	3	m.	Infants
Feb. 15	7	f.	Junior Mixed	Oct. 30	3	f.	Infants
Aug. 8	6	f.	Infants	Nov. 10	5	f.	Infants

There is a slight appearance of diffusion amongst the infants in the latter half of the year.

No. on School Register, 101 :—

Date of Eruption	Age	Sex	Department	Date of Eruption	Age	Sex	Department
Feb. 5.....	12	f.	Girls	Oct. 14	8	m.	Boys
June 19	12	f.	Girls	Oct. 14	11	m.	Boys
July 16	12	m.	Boys	Dec. 21	10	m.	Boys
				Dec. 23	13	m.	Boys

There would seem to have been an overlooked case in school in October.

No. on School Register, 113 :—

Date of Eruption	Age	Sex	Department	Date of Eruption	Age	Sex	Department
Feb. 8.....	7	f.	Mixed	July 9	9	f.	Mixed
Jan. 28	5	m.	Infants	Aug. 26	4	m.	Infants
March 14.....	4	f.	Infants	Sep. 6	9	f.	Girls
March 22.....	5	f.	Infants	Sep. 10	10	m.	Boys
May 1	10	f.	Mixed	Sep. 13	11	f.	Girls
May 3	5	m.	Infants	Sep. 17	8	f.	Girls
June 18	12	f.	Mixed	Nov. 22	4	m.	Infants

There is evidence of diffusion in the mixed department in September.

No. on School Register, 131 :—

Date of Eruption	Age	Sex	Department	Date of Eruption	Age	Sex	Department
Jan. 31	12	m.	Mixed	March 16	7	m.	Mixed
Jan. 31	8	m.	Mixed	March 17	9	m.	Mixed
Feb. 22	12	m.	Mixed	May 7	10	m.	Mixed
Feb. 25	6	f.	Mixed	May 16	7	m.	Mixed
Feb. 26	4	m.	Infants	May 16	5	m.	Infants
March 3	7	m.	Mixed	Aug. 17	8	f.	Mixed
March 5	6	f.	Mixed				

There is some evidence of diffusion in February and March amongst children in the mixed department.

No. on School Register, 149 :—

Date of Eruption	Age	Sex	Department	Date of Eruption	Age	Sex	Department
March 10	7	m.	Boys	Sep. 9	6	m.	Infants
March 13	6	m.	Infants	Sep. 20	6	f.	Infants
May 17	5	f.	Infants	Sep. 22	6	m.	Infants
Aug. 28	4	m.	Infants				

There is a suggestion of the disease having been introduced into the infants' department in September.

No. on School Register, 155 :—

Date of Eruption	Age	Sex	Department	Date of Eruption	Age	Sex	Department
March 7	4	f.	Infants	March 19	8	f.	Mixed
March 13	5	f.	Infants	March 25	11	m.	Mixed
March 13	6	m.	Mixed	March 25	8	f.	Mixed
March 13	8	m.	Mixed	March 27	5	f.	Infants
March 13	5	m.	Infants	March 31	6	f.	Mixed
March 14	10	f.	Mixed	April 1	4	f.	Infants
March 14	5	f.	Mixed	April 28	6	m.	Infants
March 18	7	f.	Mixed	April 30	7	m.	Mixed
March 19	5	m.	Mixed	April 30	10	f.	Mixed

Here we have an example of a well-marked outbreak of scarlet fever in the two departments of the school of an entirely different order from the slow diffusion which ordinarily occurs.

No. on School Register, 195 :—

Date of Eruption	Age	Sex	Department	Date of Eruption	Age	Sex	Department
May 26	8	f.	Girls	Oct. 15	4	f.	Infants
Aug. 27	7	m.	Infants	Oct. 22	4	f.	Infants
Oct. 14	5	f.	Infants	Nov. 18	4	m.	Infants

Some diffusion of the ordinary type occurred amongst the infants after the holidays.

No. on School Register, 201 :—

Date of Eruption	Age	Sex	Department	Date of Eruption	Age	Sex	Department
June 12	4	f.	Infants	July 19	6	f.	Infants
June 13	6	m.	Infants	Sept. 17	4	m.	Infants
June 22	4	m.	Infants				

Some diffusion would appear to have occurred amongst children at this school in June and July.

TRACING OF CASES.

In 1898, out of a total of 897, 166 were traced to direct infection, or rather less than the proportion in enteric, 64 were doubtfully traced, 20 were ascribed to school infection, and 26 could be set down to overlooked cases, with a high degree of probability.

The following cases are of some interest :—

No. 15. No source of infection could be ascertained, except correspondence with friends who have scarlet fever in the house.

No. 132. Probably brought by a visitor from an infected house.

No. 179. Mother has been suffering from quinsy.

No. 679. Washed the clothes of a scarlatina patient.

No. 796. Probably conveyed in infected clothing.

No. 896. Probably conveyed home by mother, who had visited a fever hospital.

Nos. 902 and 903. Mother has been suffering from quinsy.

I have not considered it necessary to give the full history of doubtful cases.

It will be seen that the above figures differ slightly from those given under "closets," which were compiled for me. Transfer, however, three of the better ascertained overlooked cases to the number of traced cases, and four of the last series of cases to the doubtful figures, and the figures would be identical.

Referring to the tables, we perceive that the case fatality in 1898 was considerably under that holding in the years 1891–1898, so that the type of the disease during its decline was comparatively mild.

As regards the fatality of the disease at different age-periods, we perceive that this is greatest in infancy, and declines up to the age 10–15, after which it undergoes increase, in this resembling typhoid fever, although there is nothing like the steady ascent of fatality in that disease with advancing years.

DIPHThERIA, MEMBRANOUS CROUP.

The following are the tables relating to Diphtheria and Membranous Croup during the year 1898 :—

DIPHThERIA, MEMB. CROUP.—ATTACKS IN WEEKS, ACCORDING TO DATE OF ONSET.

FIRST QUARTER			SECOND QUARTER			THIRD QUARTER			FOURTH QUARTER		
Jan.	8	6	April	9	1	July	9	3	Oct.	8	2
„	15	1	„	16	4	„	16	5	„	15	1
„	22	1	„	23	5	„	23	5	„	22	6
„	29	3	„	30	3	„	30	7	„	29	5
Feb.	5	3	May	7	4	Aug.	6	1	Nov.	5	8
„	12	7	„	14	...	„	13	3	„	12	5
„	19	1	„	21	1	„	20	5	„	19	3
„	26	...	„	28	1	„	27	3	„	26	4
Mch.	5	4	June	4	2	Sept.	3	11	Dec.	3	11
„	12	3	„	11	4	„	10	6	„	10	2
„	19	5	„	18	...	„	17	4	„	17	2
„	26	1	„	25	3	„	24	5	„	24	10
April	2	1	July	2	...	Oct.	1	6	„	31	9
Total...	36		Total...	28		Total...	64		Total...	68	

City total, 196.

DIPHThERIA AND MEMB. CROUP ATTACKS.—RATES PER 1,000 LIVING, COMPARED WITH MEAN OF FIVE YEARS.

	1893	1894	1895	1896	1897	Mean	1898
Twelve Notification Towns ...	0·54	0·51	0·47	0·62	0·58	0·54	0·85
City of Manchester	1·20	0·98	0·76	0·44	0·29	0·73	0·36
Manchester Township.....	0·90	0·73	0·48	0·32	0·22	0·53	0·20
North Manchester	1·45	1·48	1·39	0·67	0·37	1·07	0·70
South Manchester	1·25	0·85	0·58	0·39	0·26	0·67	0·26

DIPHTHERIA, MEMB. CROUP.—ATTACKS, DEATHS, AND CASE FATALITY
PER CENT. AT DIFFERENT AGES.

AGES	ATTACKS	DEATHS	CASE FATALITY*
Under one year.....	9	8	88·9
1 to 2 years	15	7	46·7
2 to 3 „	16	7	43·8
3 to 4 „	19	6	31·6
4 to 5 „	21	6	28·6
5 to 6 „	13	9	69·2
6 to 7 „	13	1	7·7
7 to 8 „	12	3	25·0
8 to 9 „	13	1	7·7
9 to 10 „	6	1	16·7
10 to 15 „	18	2	11·1
15 to 20 „	6	1	16·7
20 to 25 „	10	2	20·0
25 to 35 „	14	1	7·1
35 to 45 „	10	...	...
Over 45 „	1	...	...
All ages.....	196	55	28·1

* The percentages in this column are the actual proportions of fatal cases to the attacks at those ages.

DIPHTHERIA, MEMB. CROUP, 1891-1898.—ATTACKS, DEATHS, AND CASE
FATALITY PER CENT. AT DIFFERENT AGES.

AGES	ATTACKS	DEATHS	CASE FATALITY PER CENT.
Under one year.....	99	75	75·9
1 to 2 years	246	165	67·0
2 to 3 „	263	159	60·4
3 to 4 „	302	140	46·3
4 to 5 „	264	106	40·1
5 to 6 „	213	87	40·8
6 to 7 „	121	33	27·3
7 to 8 „	117	26	28·9
8 to 9 „	100	17	17·0
9 to 10 „	89	11	12·4
10 to 15 „	313	21	6·7
15 to 20 „	261	15	5·7
20 to 25 „	215	7	3·3
25 to 35 „	273	9	3·3
35 to 45 „	134	3	2·2
Over 45 „	64	2	3·1
All ages	3,074	876	28·5

DIPHTHERIA AND MEMBRANOUS CROUP.—ATTACKS IN DISTRICTS, WITH
ATTACK RATE, CASE FATALITY PER CENT., AND REMOVALS TO HOSPITAL
PER CENT.

DISTRICTS	ATTACKS	ATTACK RATE PER 1,000 LIVING	† CASE FATALITY PER CENT.	REMOVALS TO HOSPITAL PER CENT.
Ancoats	4	0·09	75·0	...
Central.....	5	0·14	...	60·0
St. George's	20	0·31	25·0	35·0
Cheetham	19	0·61	26·3	47·4
Crumpsall	3	0·30	...	...
Blackley	2	0·25	50·0	...
Harpurhey	5	0·40	20·0	20·0
Moston	15	2·20	26·7	46·7
Newton Heath.....	54	1·44	24·1	46·3
Bradford	3	0·13	33·3	66·7
Beswick .....	...	...	...	...
Clayton	1	0·24	...	...
Ardwick	11	0·29	27·3	9·1
Openshaw	4	0·13	50·0	25·0
Gorton (West)	5	0·18	...	40·0
Rusholme and Kirk.	9	0·45	44·4	66·7
Chorlton-on-Medlock	18	0·29	33·3	27·8
Hulme	18	0·25	38·9	16·7
City of Manchester	196	0·36	28·1	36·8

† Corrected : the fatal cases are those actually occurring amongst the cases notified.

DIPHTHERIA, MEMB. CROUP MORTALITY.—RATE PER 1,000 LIVING,
COMPARED WITH MEAN OF FIVE YEARS.

	1893	1894	1895	1896	1897	Mean	1898
England and Wales	0·32	0·28	0·25	0·29	0·24	0·28	0·24
33 Great Towns	0·43	0·38	0·36	0·38	0·31	0·37	0·31
London	0·76	0·62	0·53	0·60	0·51	0·60	0·40
Manchester City	0·35	0·29	0·21	0·15	0·08	0·22	0·09
Manchester Township	0·30	0·27	0·16	0·13	0·08	0·19	0·06
North Manchester	0·38	0·37	0·37	0·23	0·10	0·29	0·15
South Manchester	0·37	0·24	0·16	0·12	0·08	0·19	0·08
67 Smaller Towns	0·19	0·19	0·23	0·25	0·24	0·22	0·28
Rural Districts	0·24	0·24	0·19	0·23	0·19	0·22	0·18

ATTACKS OF DIPHTHERIA AND MEMB. CROUP REPORTED AND ACCEPTED IN
WEEKS, ACCORDING TO DATE OF ONSET.

1896.

FIRST QUARTER			SECOND QUARTER			THIRD QUARTER			FOURTH QUARTER		
Jan.	4	8	April	4	5	July	4	1	Oct.	3	3
"	11	5	"	11	3	"	11	5	"	10	5
"	18	9	"	18	6	"	18	5	"	17	3
"	25	8	"	25	3	"	25	5	"	24	4
Feb.	1	7	May	2	5	Aug.	1	3	"	31	0
"	8	11	"	9	4	"	8	2	Nov.	7	3
"	15	8	"	16	4	"	15	4	"	14	2
"	22	3	"	23	1	"	22	3	"	21	5
"	29	7	"	30	2	"	29	3	"	28	5
Mch.	7	12	June	6	6	Sept.	5	2	Dec.	5	4
"	14	4	"	13	1	"	12	10	"	12	8
"	21	5	"	20	3	"	19	1	"	19	3
"	28	7	"	27	6	"	26	4	"	26	2
									Jan. 2 '97		1
Total...	94		Total...	49		Total...	48		Total...	48	

City Total, 239.

1897.

FIRST QUARTER			SECOND QUARTER			THIRD QUARTER			FOURTH QUARTER		
Jan.	9	1	April	10	4	July	10	0	Oct.	9	7
"	16	5	"	17	1	"	17	0	"	16	7
"	23	3	"	24	3	"	24	5	"	23	3
"	30	2	May	1	1	"	31	0	"	30	1
Feb.	6	4	"	8	6	Aug.	7	5	Nov.	6	4
"	13	1	"	15	1	"	14	1	"	13	5
"	20	1	"	22	3	"	21	8	"	20	4
"	27	3	"	29	5	"	28	4	"	27	3
Mch.	6	4	June	5	1	Sept.	4	3	Dec.	4	6
"	13	2	"	12	0	"	11	0	"	11	3
"	20	1	"	19	1	"	18	3	"	18	3
"	27	4	"	26	1	"	25	5	"	25	2
April	3	1	July	3	1	Oct.	2	5	Jan. 1 '98		3
Total...	32		Total...	28		Total...	39		Total...	51	

City Total, 150.

These facts are certainly of increased value since the cases were submitted to bacteriological examination.

The following is a summary of cases of diphtheria and membranous croup in 1898, in relation to bacteriological examination :—

Examined and found positive	Examined and found negative, but the diagnosis is adhered to	No Specimen taken
128	16	49

Cases Removed to Monsall	Cases notified by Certificate	Cases examined and found negative, of which the result was accepted
71	263	266

It will thus be seen that altogether 410 cases were submitted to examination. In addition, the cases before discharge from Monsall were submitted to examination to ensure the freedom of the patients from infectivity on discharge. Some other examinations were also made in connection with the internal administration of the Hospital.

The number of examinations will be seen to greatly exceed those notified by certificate, but, as has been already explained elsewhere, in order to encourage the application of the test, medical men can use the test before certifying. The total number of cases finally accepted include those certified without any specimen being taken, those found to give a positive bacteriological result, and those in which the practitioner adheres to his diagnosis. It is believed that the information thus obtained as to the distribution of the disease is reliable.

The term diphtheria does not include membranous croup, cases of which are still registered separately. This is a convenient division, since, although the proportion of cases of membranous croup yielding the bacillus of diphtheria in the New York investigations was higher than the proportion of cases of diphtheria giving the bacillus, we have not been able to get anything like the corresponding number of cases of membranous croup submitted to bacteriological examination. The arrangements in New York for taking samples are much more complete than we possess.

Thus, while out of 20 cases accepted as membranous croup 7 only were examined bacteriologically, out of 173 cases of diphtheria finally accepted 137 were submitted to examination.

The number of disputed results (and each negative case is separately inquired into) was 16 out of 410, or close on 4 per cent.

Although the proportion of cases of membranous croup submitted to examination is small, it is still an advance on previous years, and it may be hoped that it will increase. There is not, however, the same risk of error here as in the case of diphtheria.

Referring now to the tables, we see that the mortality from diphtheria was somewhat higher than in 1897, though lower than in other recent years.

The figures are :—

	1891	1892	1893	1894	1895	1896	1897	1898
Notified cases	456	497	622	512	402	325	244	263
Accepted .....	...	...	...	...	...	239	149	193
Removed to Hospital ...	87	122	114	117	69	48	46	71
Death-rate.....	0·25	0·25	0·35	0·29	0·21	0·15	0·08	0·09

The mortality was also considerably below that of London and the other great towns, as well as of the country generally.

From the foregoing remarks it will be evident that the death-rates in 1896, 1897, and 1898 cannot be strictly compared with the death-rates in other years. Nevertheless, it would appear to be evident from the death-rates that there must have been a diminution in the incidence of true diphtheria in the last three years.

As regards the distribution and fatality of cases according to age, accepting for the time the figures of the years from 1891 to 1895, we see that the cases are much less common in the first than in the second, somewhat less common in the second than in the third year of life, and most numerous in the fourth year, from which year they begin to diminish, though maintaining a considerable incidence up to the 35th year.

The fatality at different ages, judging from these figures, would seem to have a different law from that of scarlet fever and enteric fever, and continues steadily to diminish with advancing years.

It will be interesting to revise this conclusion in the light of the figures as controlled by bacteriological examination. This test should assuredly be applied, since the absence of the bacillus in cases regarded as possibly diphtheritic in their nature is much more frequent in the adult than in young children.

In the analysis of the cases it will be advisable to follow as far as possible the order of 1897.

Of the 128 cases of diphtheria and membranous croup examined bacteriologically who gave positive results 24 died.

Of the 16 cases in which the diagnosis was maintained spite of a negative bacteriological result 4 died, one from membranous croup and three from diphtheria.

Of the 49 cases not examined (36 diphtheria and 13 membranous croup) 28 died, of whom 19 were diagnosed as diphtheria and 9 as membranous croup. Doubtless the large number of deaths in this last class arises from the circumstance that a bacteriological diagnosis could often not be made when the disease was recognised.

PARETIC AND PARALYTIC SEQUELAE.

Four of the cases removed to hospital, according to Dr. Marsden, suffered from post diphtheritic paralysis.

Name	Age	Date of Onset	Date of Antitoxin	Amount of Antitoxin	Remarks
H. B. H.	4	May 10, 1898	May 13	3000 Units	Palatal paralysis end of 5th week, cardiac irregularity end of 7th week
E. F. H.	4	Sep. 14, 1898	Sep. 16	1500 Units	Cardiac irregularity end of 5th week, palatal paralysis end of 8th week
E. C. ...	10	Oct. 19, 1898	Oct. 26	3000 Units	Palatal paralysis end of 2nd week, cardiac irregularity end of 4th week
M. A. W.	4	Oct. 18, 1898	Oct. 26	3000 Units	Cardiac irregularity end of 3rd week, palatal paralysis end of 5th week

Among the others, I learn from a special inquiry made by the Sanitary Inspectors that the following sequelae occurred :—

No.	Bact. Exam.	Sequelae
6	—	Drooping of the eyelids, loss of vision, nasal speech, difficulty in swallowing
10	+	Drooping of the eyelids, loss of vision, nasal speech, difficulty in swallowing
16	Not made	Died suddenly during apparent recovery
18	+	Drooping of the eyelids
19	+	Thick speech, and difficulty in breathing
23	+	Loss of vision, difficult speech
29	Not examined	Died during apparent recovery
30	+	Sight weak, difficulty in swallowing
35	+	Drooping of eyelids, loss of vision, nasal speech, difficulty of swallowing
36	+	Nasal speech, difficulty in swallowing
37	+	Drooping of eyelids, loss of vision
49	+	Eyelids, vision, swallowing difficult
51	+	Paresis of eyelids

PARETIC AND PARALYTIC SEQUELAE—*continued.*

No.	Bact. Exam.	Sequelae
58	+	Nasal speech, swallowing difficult
59	+	Eyelids, vision, nasal speech, swallowing difficult
66	+	Nasal speech, swallowing difficult
69	None taken	Eyelids, vision
72	+	Eyelids, lost control of bladder
81	+	Nasal speech, swallowing difficult
94	+	Ptosis, vision, nasal speech, swallowing difficult
95	+	Nasal speech, swallowing difficult
96	+	Ptosis, vision, speech, swallowing difficult
100	+	Nasal speech 3 weeks, pains in the limbs 2 months
103	+	Nasal speech, swallowing difficult
107	+	Cerebral dulness since recovery
113	+	Nasal speech, swallowing difficult
106	} +	Severe headache since recovery
114		
115	+	Sudden death during apparent recovery
116	+	Nasal speech, swallowing difficult
119	+	Ptosis, loss of vision
124	+	Slight loss of vision
127	+	Ptosis, loss of vision, nasal speech, swallowing difficult
130	+	Death during apparent recovery
134	+	Speech and vision affected
148	Not taken	Nasal speech
157	+	Ptosis, loss of vision, nasal speech, swallowing affected
166	+	Weakness of legs (?)
172	+	Ptosis, loss of vision, nasal speech, swallowing affected

Thus amongst the cases treated at home as many as 39 sequelae of a nature allied to diphtheritic paralysis are recorded. It has to be noted, however, that a large number of the observations are by one observer.

If, however, one has some difficulty in accepting so large a proportion of sequelae, an examination of the defects recorded as present at houses affected with diphtheria leaves in my mind no doubt whatever that the condition of the houses has not been completely described.

It will be remembered that last year a record of the defects observed was given, and that a prominent feature in that record was damp, or conditions giving rise to damp. Such conditions are in the record for 1898 conspicuous by their absence, and I do not hesitate to say that, apart from diphtheria, such a number of houses could not be taken here and there free from damp. So strong is my doubt on the subject that, pending inquiry, I have not thought it worth while to put on record the other insanitary conditions attaching to houses attacked by fever. It is true many defects are recorded, most of them such as should lead to the lodgment of damp about the house, but the house itself is stated to be *dry*.

Defective, however, as is certainly the record of insanitary conditions, such as it is, it points more especially to the presence of organic damp about and in many of the houses.

As regards closets, the record is as follows :—

Pails adjoins		Within 4 feet		Over 4 feet distant	
Not Defective	Defect.	Not Defect.	Defect.	Not Defect.	Defect.
43	0	4	0	73	2
Midden—					
Adjoins		Within 6 feet		Over 6 feet distant	
1		6		18	
Water-closet					
46					

Making every allowance for improvements in the closets, the above appears to me difficult of acceptance. It will be observed, however, that the proportion of water-closets is much higher than in the case of enteric fever and scarlet fever. This again leads us back to organic damp, since the high proportion of water-closets is certainly owing to the large number of new houses in the outlying districts in which diphtheria has occurred. In many of these the paving and sewerage near the houses is such as to favour that condition of damp soil which we have previously seen to be favourable to the presence of diphtheria.

Although, however, the record is defective, it is still of interest to note what conditions are recorded in cases of membranous croup. These we have seen to number 20. If we reject one case of an adult, which gave a negative reaction, we have 19 left, of whom 6 attended school. Of the remaining 13, one was traced to a previous attack of diphtheria. In the case of the 12 children left, a pail adjoining the house was present in 6. In 4 cases the closet was a water-closet, while in one case it is noted that the passage was unpaved, and pools of filthy water lay about. In one case the pail was eight feet distant, and in one five feet.

Thus, even with the imperfect information available, the conditions at these houses are notably bad.

The subject requires, however, special investigation.

The distribution of the 173 cases of diphtheria, as distinguished from membranous croup, finally accepted was as follows :—

Cases positively diagnosed				Cases either not examined or giving a negative result—36 and 14 respectively			
Age	Male		Female	Age	Male		Female
0 — ...	1	...	1	0 — ...	3	...	2
1 — ...	1	...	2	1 — ...	5	...	1
2 — ...	4	...	5	2 — ...	4	...	2
3 — ...	3	...	6	3 — ...	4	...	0
4 — ...	8	...	7	4 — ...	0	...	2
5 — ...	21	...	24	5 — ...	5	...	4
10 — ...	5	...	10	10 — ...	1	...	2
15 — ...	7	...	4	15 — ...	3	...	1
25 — ...	5	...	4	25 — ...	2	...	3
35 — ...	1	...	3	35 — ...	3	...	3
45 + ...	0	...	1	45 + ...	0	...	0
<hr/>				<hr/>			
Total ...	...56		67	Total ...	...30		20
<hr/>				<hr/>			
Total ... ...123				Total ... ...50			

For membranous croup the figures are :—

				Male		Female	
Under 5	...	...	...	7	...	...	9
Over 5	...	...	...	2	...	...	2
				<hr/>			
Total				... ...20			

Of these, 13 died.

Arranging the cases of diphtheria traced to known sources in the same manner, we get :—

TRACED CASES.

Age	Male	Female
0 —	0	0
1 —	1	1
2 —	3	1
3 —	0	3
4 —	3	5
5 —	7	7
10 —	0	5
15 —	0	2
25 —	3	0
35 —	2	3
45 +	0	1
Total	19	28

As in the previous two Annual Reports, we cannot fail to be struck with the large number of young children attacked who have not been exposed to any ascertainable source of infection.

I am obliged also to call attention to the small number of overlooked cases alluded to, and to say that this seems to me to indicate imperfect inquiry. Nothing is more certain in the history of this disease than that side by side with the most severe and even fatal cases are others so slight that it is extremely easy to overlook them. This class of slight case plays in diphtheria a part more important than in any other infectious disease. On the other hand, the Medical Attendants have been much more alert in seeking out these slight cases than formerly.

The impression remains with me that there is a considerable element of infection which is not due to previous cases immediately, and that this is in special relation with damp about the houses. It is noticeable that the excess of female cases over male in 1898 is exactly equal to the excess of female cases traced to direct infection over male.

Attention has been drawn in the Report for 1898 to the general resemblance of the annual curve of diphtheria to those of scarlet fever, enteric fever, and mortality from summer diarrhoea. The weekly number of cases accepted as diphtheria is therefore given in the tables, and to this I now add the weekly number accepted in 1896 and 1897. It does not seem desirable to go further back, since the error has certainly been very great in regard to this disease.

Something may be gathered as to the habit of the disease in Manchester by a study of the districts in which the incidence of the disease has been

heaviest during the years 1896, 1897, and 1898. Taking the eight districts most affected, and placing those with the highest attack rate first, we get :—

1896.—Clayton, Moston, Blackley, Harpurhey, Cheetham, Crumpsall, West Gorton.

1897.—Cheetham, Rusholme, Crumpsall, Blackley, Clayton, Moston, Chorlton-on-Medlock.

1898.—Moston, Newton, Cheetham, Rusholme, Harpurhey, St. George's, Crumpsall.

Taking these, as a whole, with the exception of the last on the second line and last but one on the third line, they include and are confined to all the outlying and most sparsely-populated districts in the City. The prevailing feature in them is that they are worse drained and worse scavenged than the more central portions. Although it is better not to rely on years previous to 1896, the general result is much the same, Newton Heath being thrown into more prominence than it occupies in these more recent years.

There are two explanations which suggest themselves for this distribution of the disease. One is that many more animals are kept in the outlying parts of any community, and that if the disease be transmissible to and from animals, the opportunities for communication are multiplied.

The other explanation suggested is that damp and badly-drained soil has to do with the causation of the disease. If the latter be admissible, the greater number of animals relative to the population would serve to increase and render the damp more potent for harm. Whether, however, the bacillus of diphtheria can grow or even live in the soil is very doubtful in the light of bacteriological facts, and the effect which damp ground has in the genesis of the disease may, therefore, be merely preliminary by causing catarrhal conditions of the mucous membrane for the reception of the bacillus.

It seems very doubtful whether the presence of the disease in animals has had anything material to do with the disease in Manchester, since in those cases in which it has been associated with the keeping of animals no evidence has been obtained that the animals suffered from diphtheria.

However, this is by no means conclusive, and the facts which we have so far obtained seem to demand a searching inquiry into the circumstances of each case such as has not yet been instituted.

So far, the facts recorded are these :—

A large number of cases of diphtheria and membranous croup occur in children who have not yet attended school, and who have, *as far as the records go*, had no contact with persons suffering from sore throat. *This needs more searching investigation.* These cases have, in 1896, 1897, and 1898, had special relation with conditions leading to the soakage of the soil with organic material.

This requires a more painstaking record.

The districts most affected by diphtheria are the outlying parts of the City, which are more sparsely populated, are damper, and contain more animals, especially cows and horses, relative to the population than do the more central parts.

On the whole the dampest districts suffer most, but, as it happens, these also contain the greatest number of cows.

No disease in animals of a diphtheritic nature has been shown to be associated with human diphtheria. This may arise from defective observation and inquiry.

On the whole, one cannot avoid feeling that the excellent opportunities offered by exact bacteriological examination have not been sufficiently used, though how that is to be done without skilled aid I do not see. At the same time, it does appear to me that, with a controlled diagnosis, we ought to learn more of the origin of the disease; such inquiries to be of value must be made by able and trained observers.

DIPHTHERIA IN SCHOOL.

It has been stated that bacteriological knowledge appears to show that the bacillus causing diphtheria cannot grow in, and be communicated from, the soil. An outbreak which occurred in Ten Acres Lane School, Newton Heath, in 1898, would seem, however, to put this view in some doubt. This is the only school which I know to have been assailed during the last five years by a well-marked outbreak of diphtheria, and it is certainly very remarkable to find that a still more severe outbreak occurred in the same school in 1894. This can hardly be coincidence.

The first outbreak occurred in March, 1894, on which occasion the school was closed for a week and thoroughly cleansed. This proceeding seemed to have the effect of stopping the school infection. At all events, the cases dropped about the time when the school was re-opened, and did not again increase.

The particulars of the occurrence in 1898 are these :—

Date of Onset			Age	Date of Onset			Age
1	.....	Feb. 27.....	12	10	.....	Sept. 2	8
2	.....	April 9	10	11	.....	Sept. 3	7
3	.....	May 15	7	12	.....	Sept. 5	7
4	.....	July 26	6	13	.....	Sept. 9	3
5	.....	Aug. 20.....	7	14	.....	Sept. 16.....	4
6	.....	Aug. 31.....	7	15	.....	Sept. 18.....	9
7	.....	Aug. 31.....	9	16	.....	Sept. 21.....	9
8	.....	Aug. 30.....	9	17	.....	Oct. 1	4
9	.....	Sept. 2	8	18	.....	Oct. 6	4

The school was closed for 3 weeks on Sept. 26th, and cleansed as usual.

It is difficult to see what explanation is available of such a remarkable recurrence, confined to this one not very large school, except a resuscitation of infection.

The number of cases in successive years from this school were :—

1894	1895	1896	1897	1898
20	1	1	0	18

In two other schools there was slight evidence of school diffusion, but only very slight.

The facts in regard to these schools are as follows :—

No. 71 on Register :—				No. 77 on Register :—			
Date of Eruption	Age	Sex	Department	Date of Eruption	Age	Sex	Department
Oct. 17.....	4	f.	Infants	Aug. 27	4	f.	Infants
Nov 9.....	4	m.	Infants	Oct. 20.....	3	m.	Infants
Nov. 25	7	m.	Infants	Oct. 24.....	12	f.	Girls
Nov. 27	7	m.	Mixed	Oct. 26.....	5	m.	Infants
Nov. 28	6	f.	Infants	Oct. 29.....	4	m.	Infants

Milk.—There has been nothing pointing to the spread of diphtheria by milk in 1898.

ENTERIC FEVER.

INVESTIGATION OF CASES.

The bacteriological investigation of cases of enteric fever has now become an institution in Manchester, and is recognised to be a valuable aid in the diagnosis of the disease by the medical practitioners of the City, although one has still to point out that this aid has not had the effect of hastening the formation of a diagnosis to anything like the extent which might reasonably have been expected.

This is the more to be regretted, because the early recognition of this disease, more than that of any other acute fever, enables us to arrest the spread of infection. The facts as regards bacteriological examination in 1898 are these: 746 cases were notified as enteric fever in the usual manner, 911 were submitted to bacteriological examination, of which 568 gave a positive reaction and 343 a negative reaction. In 37 cases no test was applied. In 37 instances the practitioner adhered to his diagnosis of enteric fever, although the reaction had proved negative, making 4 per cent. of all cases examined. This must be regarded as a very small proportion. It includes some cases in which the negative reaction would have proved correct, some in which the test was applied too soon, and a small residue in which the test failed.

It will be observed that the number of cases examined by the serum test exceeds the number notified by 165, or, if we add the 37 in which no test was applied, by 202. The reason of this anomaly is that many practitioners prefer to have a preliminary test made before committing themselves to a diagnosis. These 202 cases, then, may be regarded as instances in which the test helped to avoid both trouble and expense, as is also the case with the 343, less 37, that is 306, in which the negative reaction was accepted.

It can scarce be doubted, then, that the procedure is economical. The above is the principal reason for the large number of examinations, but is not the sole reason. In not a few instances the test was applied to cases which had been overlooked, or to doubtful illnesses in other members of a family in which one or more persons certainly had the disease.

It is certainly matter for the greatest satisfaction that the examinations have been so completely carried out. It need scarcely be said that this is in very large measure owing to the high point of excellence to which the method has attained in Professor Delépine's laboratory.

HISTORY OF ENTERIC FEVER IN 1898.

On referring to the table in this section, showing the enteric fever attacks in weeks, it will be seen that although there was no excess of the disease in the second and third quarters, there was a very marked increase in the fourth quarter.

The relation will be readily seen if we excerpt the corresponding figures for different years.

ENTERIC FEVER ATTACKS REPORTED IN QUARTERS.

	FIRST QUARTER	SECOND QUARTER	THIRD QUARTER	FOURTH QUARTER
1891	173	119	180	289
1892	164	106	156	184
1893	108	80	220	210
1894	118	75	135	132
1895... ..	110	90	100	193
1896	118	130	108	157
1897	97	57	137	212
1898	143	79	134	286

It will be observed that in the fourth quarter of 1898 the number of cases notified was more than double the number in the third quarter. The course of events is the same as in the end of 1897, and the beginning of 1898. Indeed so rapid was the increase of cases in the beginning of 1899 that it was considered necessary to erect a pavilion for the accommodation of nurses.

On consulting the table showing the number of cases *whose illness began* week by week, it will be noted that the number of cases shot up from 7 in the week ending August 27th to 23 in the week ending September 3rd. This rise corresponds with a spell of very warm close weather commencing on August 11th and extending to August 23rd. A sudden leap upwards took place in the deaths from summer diarrhœa from 40 in the week ending August 20th to 84 in the week ending August 27th, and again to 107 in the week ending September 3rd. It is possible, therefore, that the same causes were in operation leading to the increase. Once having risen, the weekly number did not again descend.

The suggestion just made, that the same conditions are operative in producing the increase of deaths in summer diarrhœa and in enteric fever, may be extended to the further suggestion that the conditions act at one and the same time, and that the effective condition may be temperature, perhaps associated with certain conditions of moisture. These ideas can only be tested by a reference to tables, and I therefore proceed to extract certain **data from the Manchester weekly returns.**

TABLES SHOWING THE NUMBER OF ENTERIC FEVER CASES WHOSE ILLNESS COMMENCED IN THE WEEKS ENDING ON THE FOLLOWING DATES, AND OTHER FACTS.

1891—WEEKS ENDING

	July 18	July 25	August 1	August 8	August 15]	August 22	August 29	Sept. 5
Enteric cases reported	7	8	5	8	12	14	25	22
Deaths from Diarrhoea	7	9	5	13	8	15	19	18
Mean temperature in shade	62.6	60.3	56.6	56.7	59.4	59.1	56.8	56.5
Mean percentage of moisture	70	79	79	79	82	76	81	82
Rainfall in inches.....	0.100	1.350	0.440	1.300	1.640	0.630	2.190	0.810
Underground temperature 1 foot	61.3	63.3	59.6	58.2	59.1	60.2	58.4	56.8
Underground temperature 4 feet	57.0	57.5	58.0	57.9	57.2	57.2	57.5	57.0

1892—WEEKS ENDING

	July 16	July 23	July 30	August 6	August 13	August 20	August 27	Sept. 3
Enteric cases reported	6	10	12	9	8	9	11	20
Deaths from Diarrhoea	7	3	3	15	17	24	46	49
Mean temperature in shade	56.4	55.5	59.1	58.4	57.9	60.2	62.4	56.6
Mean per cent. of humidity	77	79	74	82	79	77	73	83
Rainfall in inches.....	1.181	0.813	0.015	0.055	1.772	0.595	1.063	2.331
Underground temperature 1 foot	58.2	56.7	59.8	59.9	59.6	60.2	61.6	58.4
Underground temperature 4 feet	55.3	55.4	55.4	56.1	56.4	56.6	57.1	57.5

1893—WEEKS ENDING

	June 10	June 17	June 24	July 1	July 8	July 15	July 22	July 29	Aug. 5	Aug. 12	Aug. 19	Aug. 26	Sept. 2
Enteric cases reported	9	10	11	7	13	10	10	10	15	14	14	20	19
Deaths from Diarrhoea	5	11	19	58	72	83	92	60	38	31	39	44	51
Mean temperature in shade ..	59.6	62.8	60.1	61.2	67.5	60.5	60.9	60.3	59.3	66.9	70.3	60.7	59.0
Mean per cent. of humidity.	70	64	73	67	59	73	74	77	75	70	73	75	78
Rainfall in inches	0.290	0.000	0.478	0.773	0.110	1.907	0.452	1.501	1.006	0.409	0.133	1.150	0.065
Underground temp. 1 foot...	59.1	61.7	64.3	61.5	65.6	65.1	61.8	61.9	61.8	63.7	67.8	64.7	61.6
Underground temp. 4 feet...	53.3	54.5	56.2	57.3	57.8	58.9	59.4	59.0	59.0	59.0	59.7	60.9	60.8

1894—WEEKS ENDING

	July 14	July 21	July 28	Aug. 4	Aug. 11	Aug. 18	Aug. 25	Sept. 1	Sept. 8
Enteric cases reported.....	6	4	6	11	13	17	14	17	9
Deaths from Diarrhoea.....	12	15	16	20	28	31	18	16	14
Mean temperature in shade	58.9	58.3	62.4	62.2	59.0	57.3	56.0	58.2	52.2
Mean per cent. of humidity	74	85	74	79	76	81	77	83	74
Rainfall in inches	0.297	1.570	1.365	1.475	0.752	0.749	1.216	0.039	0.213
Underground temperature 1 foot ...	63.5	61.7	61.8	63.9	61.6	59.7	58.1	58.2	56.6
Underground temperature 4 feet ...	56.6	57.7	58.0	58.2	58.8	58.7	58.0	57.5	57.2

1895—WEEKS ENDING

	Aug. 3	Aug. 10	Aug. 17	Aug. 24	Aug. 31	Sept. 7	Sept. 14	Sept. 21
Enteric cases reported	8	6	8	9	6	8	12	8
Deaths from Diarrhoea	29	31	46	62	60	68	74	60
Mean temperature in shade	58.0	59.2	61.6	64.1	59.7	61.0	59.7	57.6
Mean per cent. of humidity	80	78	78	67	78	78	77	83
Rainfall in inches	0.375	1.246	0.608	0.208	1.450	1.426	0.185	0.000
Underground temperature 1 foot	61.8	61.5	61.6	64.5	62.3	61.5	60.8	59.0
Underground temperature 4 feet	58.4	58.5	58.5	58.7	59.2	59.3	59.0	58.8

1896—WEEKS ENDING

	July 11	July 18	July 25	Aug. 1	Aug. 8	Aug. 15	Aug. 22	Aug. 29	Sept. 5
Enteric cases reported	10	7	5	7	8	8	11	6	14
Deaths from Diarrhoea.....	11	42	60	61	47	46	18	27	21
Mean temperature in shade	63.3	61.6	62.0	59.4	56.9	59.1	58.2	55.6	58.1
Mean per cent. of humidity	74	64	68	70	68	78	79	84	87
Rainfall in inches	0.575	0.015	0.955	0.290	0.063	0.245	0.492	1.422	1.180
Underground temperature 1 foot ...	62.8	64.9	64.6	61.4	60.8	60.7	60.8	59.1	58.1
Underground temperature 4 feet ...	58.0	58.8	59.6	59.8	59.5	59.1	58.8	58.9	58.3

	July 17	July 24	July 31	Aug. 7	Aug. 14	Aug. 21	Aug. 28	Sept. 4	Sept. 11
Enteric cases reported	3	6	5	3	8	7	17	20	12
Deaths from Diarrhoea	7	15	35	73	154	171	116	71	63
Mean temp. in shade	63·7	63·7	63·1	69·2	60·2	60·0	59·2	55·6	52·0
Mean per cent. of humidity	59	67	81	59	76	68	78	78	72
Rainfall in inches	0·000	0·388	0·842	1·179	0·445	0·761	0·400	2·302	0·405
Underground temp. 1 foot.....	62·9	63·6	63·9	66·1	64·3	62·1	60·7	59·3	54·5
Underground temp. 4 feet.....	57·3	58·0	58·8	59·5	60·3	60·3	60·1	59·5	58·5

1898—WEEKS ENDING

	July 16	July 23	July 30	Aug. 6	Aug. 13	Aug. 20	Aug. 27	Sept. 3	Sept. 10	Sept. 17	Sept. 24	Oct. 1	Oct. 8
Enteric cases reported	7	4	4	6	7	8	7	23	15	13	18	21	28
Deaths from Diarrhoea	9	5	16	32	52	40	84	107	103	105	120	106	48
Mean temp. in shade	60·8	61·2	58·9	60·6	61·4	65·0	62·6	58·7	67·8	64·1	56·2	46·1	56·4
Mean per cent. of humidity.	67	70	74	78	76	73	77	73	80	73	78	75	83
Rainfall in inches	0·000	0·275	0·070	2·377	1·062	0·118	0·986	0·566	0·090	0·150	0·073	0·273	0·000
Underground temp. 1 foot...	61·4	62·1	61·3	61·3	60·3	63·4	63·7	59·6	62·5	62·2	60·1	53·6	54·1
Underground temp. 4 feet...	56·2	57·2	57·8	58·2	58·3	58·6	59·3	59·5	59·0	59·5	59·5	58·8	57·1

When this is done, we perceive that in 1898, while the ascent of enteric fever is sudden, that of diarrhoea is gradual, the diarrhoea wave beginning to ascend in the week ending July 30th, and gradually rising. The steepest ascents, however, are in the weeks ending August 27th and September 3rd.

In 1891 there is a sudden increase in the number of cases of enteric fever reported in the week ending August 29th. In that year again the rise in the number of deaths from diarrhoea is gradual, the first sharp rise occurring in the week ending August 8th, or three weeks before. The diarrhoea rise is small, and not sustained.

In 1892 a sudden increase in the number of cases of enteric fever occurs in the weeks ending July 23rd and July 30th. There is then a decline, and the true autumnal rise commences sharply in the week ending September 3rd.

The diarrhoea curve begins to rise in the week ending August 6th, and ascends gradually, but a marked leap occurs in the week ending August 27th, or two weeks before the enteric rise.

In 1893 the enteric cases undergo a rise in the week ending July 8th, but the true autumnal rise sets in sharply in the week ending August 5th.

A marked leap upwards takes place in the diarrhoea deaths in the week ending July 1st, or five weeks before the enteric rise.

In 1894 the enteric cases ascend in the week ending August 18th. The diarrhoea curve ascends gradually, and the first marked increase of deaths takes place in the week ending August 11th.

In 1895 there is no abrupt rise in the enteric cases, and no outstanding increase in diarrhoea deaths.

In 1896 a clear increase of enteric cases takes place in the week ending August 22nd. The diarrhoea increase occurs five weeks before.

In 1897 a sharp increase takes place in the number of enteric fever cases commencing in the week ending August 28th, and abrupt increases in the number of deaths from diarrhoea two and three weeks before.

It is a truly remarkable thing to find enteric fever commencing to increase with such abruptness year by year, when we consider the variable time occupied in observation before a case is reported. So much is this so that one is tempted to think of some cause, such as the return of medical men from their holidays. This would not explain every year, however, and I am satisfied on other grounds that it is not the correct explanation. It must be particularly noted that the number of cases recorded week by week relates to the commencement of illness, and not to the number of cases notified in that week.

The latent period of enteric fever is generally from a fortnight to three weeks. Hence the dissemination of infection which gives rise to this sudden increase must have occurred from two to three weeks earlier, which coincides generally with the average period at which a marked increase takes place in the number of deaths from summer diarrhoea.

That is to say, a marked increase takes place in the germs causing enteric fever and those causing summer diarrhoea about the same time; the actual commencement of the prevalence of those organisms which cause diarrhoea is, however, somewhat earlier.

It has not yet been definitely settled what the actual germ causing summer diarrhoea is, although suspicion has lately been directed towards certain forms of bacilli. We do not know how long it would take for a massive growth of the specific germ to take place, though it may be assumed that it would not need more than a few days in favourable soil.

The abrupt commencement of the autumnal enteric rise must be taken as sufficient proof that a rapid growth of the typhoid bacillus can occur near the surface of the ground.

If, now, we take a firm grasp of the fact that nearly every year about three weeks, more or less, previous to a given week a rapid growth of the bacillus of typhoid fever must have occurred in the soil and been conveyed to infected individuals, we have a definite point to start from. If we assume that water is not always, or generally, the medium by which the infection is carried, and that it can, in some way, be derived from polluted soil and middens, we are carried thus far further that the conditions, at that period, must have been such as to alternately cause the favourable soil to be wetted, and to be dried sufficiently to permit the detachment of the bacillus. The determining point of infection would then be, not the cessation of rainfall, but that period of subsequent drought at which the specific bacteria could get detached from the soil, assuming detachment to be necessary.

Applying these considerations to the successive years, we find that in 1891, corresponding to the increase in cases reported in the week ending August 29th, rain fell on the first four days of the week ending July 25th to the amount of 1.350 inches, followed by five days of dry weather. The one-foot thermometer for this week averaged $63^{\circ}\cdot3$, the four-foot $57^{\circ}\cdot5$. This takes us back five weeks.

In 1892, corresponding to the increase in the enteric cases in the week ending September 3rd, the first week of the autumnal rise, we find that on August 7th and 8th there was a heavy fall of rain = 1.182 inches, then three days of dry weather. The average temperature for the week ending August 13th were: one-foot thermometer = $59^{\circ}\cdot6$, four-foot $56^{\circ}\cdot4$.

Rain also fell on August 15th = 0.425 inch, followed by a spell of dry weather. This takes us back four weeks.

A false rise in the number of cases took place in the week ending August 13th, and we find that on the week ending July 9th it rained every day, followed by five dry days. The corresponding weekly temperatures were: one-foot thermometer 59°·6, four-foot thermometer 54°·8. This takes us back five weeks.

1893.—Corresponding to the increase in cases in the week ending August 5th, rain fell on June 26th, 27th, and 28th = 0.773 inch, followed by a spell of dry weather.

The corresponding average temperatures were:—

1-foot thermometer	.....	61°·5
4-foot thermometer	.....	57°·3

This takes us back five weeks.

1894.—Corresponding to the increase of cases in the week ending August 18th, we find that rain fell every day from July 15th to July 21st = 1.570 inches, followed by two dry days; and again July 24th and 25th = 1.365 inches, followed by five dry days.

The corresponding average temperatures:—

		Week Ending July 21st		Week Ending July 28th
1-foot thermometer	.....	61°·7	.....	61°·8
4-foot thermometer	.....	57°·7	.....	58°·0

1895.—No clear indications possible. See above.

1896.—Corresponding to the increase of cases in the week ending August 22nd, we find that rain fell on July 8th and 9th = 0.575 inch, followed by a spell of dry weather; and on July 21st to 25th = 0.955 inch, followed by a spell of dry weather.

The average temperatures were—

		Week Ending July 11th		Week Ending July 25th
1-foot thermometer	.....	62°·8	.....	64°·6
4-foot thermometer	.....	58°·0	.....	59°·6

The first takes us back six weeks. The second takes us back four weeks.

1897.—Corresponding to the increase of cases in the week ending August 28th, we find that rain fell on—

July 25th to 28th = 0.842 inch, followed by seven days dry weather.

July 20th = 0.224 inch, followed by three days dry weather.

The corresponding average temperatures were—

		Week Ending July 24th		Week Ending July 31st
1-foot thermometer	.....	63°·6	.....	63°·9
4-foot thermometer	.....	58°·0	.....	58°·8

The corresponding intervals are four weeks and five weeks.

1898.—Corresponding to the increase in cases in the week ending September 3rd, we find that rain fell—

On August 2nd to 6th = 2·377, followed by 1 day of dry weather

On August 8th to 10th = 1·062, followed by 10 days of dry weather.

The first date may be dismissed. In the week ending August 13th—

The 1-foot thermometer averaged 60°·3.

4-foot thermometer averaged 58°·3.

This corresponds to an interval of 3 weeks.

We thus see that the necessary conditions are fulfilled at a period antedating the increase of cases which averages four weeks and over.

Taking the dates thus obtained, let us see how they stand to deaths from diarrhœa :—

1891.—The rainfall in the beginning of the week ending July 25th corresponds to an increase in deaths from diarrhœa in the week ending August 8th, *i.e.*, two weeks.

1892.—The rainfall on August 7th and 8th corresponds to a marked increase of diarrhœa deaths in the week ending August 27th, *i.e.*, two weeks after.

1893.—The rainfall on June 26th, 27th, and 28th corresponds to a sharp increase in diarrhœa deaths within a week, and to a less marked increase within 14 days.

1894.—The rainfall on July 24th and 25th corresponds to an increase of diarrhœa deaths in the ensuing week.

1896.—The rainfall on July 8th and 9th corresponds to a sharp increase of deaths from diarrhœa in the ensuing week.

1897.—The rainfall on July 20th, and the rainfall July 25th to 28th, each correspond to sharp increases of diarrhœa deaths two weeks after.

1898.—The rainfall on August 8th to 10th corresponds to sharp diarrhœal increases two and three weeks after.

It would appear from the foregoing that if we regard the periods of rainfall arrived at in the above manner as indicating the period of rapid multiplication and extension of the bacillus of typhoid fever, which would thus

require a good soaking of the ground, the same period foreruns by a period lying between a week and a fortnight a sharp increase in the number of deaths from diarrhoea. If we allow a few days for the growth and extension of the diarrhoeal germs, and a week between illness and death, this period is what would be required for the growth to come into action. This inquiry, then, goes far to show that the conditions assumed are those which are requisite to start the germs of summer diarrhoea and typhoid fever into vigorous growth, and that the two different organisms receive a simultaneous impulse to free growth towards, and in, shady places on the surface of the soil. Such shady places are found especially about privies and on the under surface of privy seats.

It has been pointed out in previous reports that scarlet fever undergoes a similar autumnal increase, the curve being more acute than that of enteric fever, but less acute than that of diarrhoea. An examination of the figures does not indicate, however, that the processes are alike in this disease and in the other two.

Assuming, now, that our hypothesis of the mode and cause of increase of the germs of typhoid fever and summer diarrhoea is correct, further light may be expected to be thrown on the subject by a scrutiny of the conditions of weather preceding the critical rainfalls.

When we do this we find that in all cases these occur upon ascending readings of the ground thermometers. As regards rainfall, the facts are these :—

In 1891, previous to the critical rainfall, there was a spell of dry weather of 11 days' duration.

In 1892 there was a spell of dry weather of 18 days' duration.

In 1893 there was a spell of dry weather of 28 days' duration, there being no rain at all on 11 days immediately preceding the critical rainfall.

In 1894 the rainfall, July 15–21, was preceded by dry weather for 12 days, the highest rainfall, which was on July 13, being 0·175 inch.

In 1896 the rainfall was preceded by a week of dry weather, there being no rain on the three days immediately preceding.

In 1897, preceding the heavy rainfall on July 24–28, there was no rain for three days. Preceding the moderate fall on July 20 there was no rain for 10 days.

In 1898 the rainfall of August 2 to August 6 was preceded by 12 days of dry weather, there being no rainfall on July 24, July 25, July 27, July 29, 30, 31, or August 1st.

Preceding, therefore, what I venture to call the critical rainfall, which in all cases comprises a fall sufficient to flush the soil, there is in every instance a sustained spell of warm dry weather, which will have had the effect of thoroughly drying the surface in all but those occluded and dirty places in which we may suppose the bacillus typhosus to lurk. It is open to us to suppose that the soil is thus prepared for the rapid growth of the typhoid bacillus and of the germ of summer diarrhoea along the wetted pores of the soil, perhaps by the destruction (through drought) of conflicting bacteria.

If, now, we can regard the periods which I have called the periods of critical rainfall as the determining periods of the growth of the bacillus typhosus we may put aside a view which has received some favour, viz., that the decay of vegetation in the autumn, by presenting a favourable medium growth for the bacillus, has to do with the diffusion of typhoid fever. The periods named are for the most part too early for this hypothesis.

We can scarcely suppose, then, that when there is diffusion of typhoid fever by a water supply this can have anything to do with a widely diffused growth of the germ on a gathering ground, except such gathering ground has been manured with unsterilized excrement. We must rather believe that specific pollution from the neighbourhood of human abodes, and owing human origin at some antecedent period, has been washed into the supply.

We may now return to the course of Enteric Fever in Manchester in 1898. The usual tables are here inserted for reference :—

ENTERIC FEVER ATTACKS IN WEEKS, ACCORDING TO DATE OF ONSET.

FIRST QUARTER		SECOND QUARTER		THIRD QUARTER		FOURTH QUARTER	
Jan. 8	13	April 9	9	July 9	1	Oct. 8	28
„ 15	12	„ 16	10	„ 16	7	„ 15	39
„ 22	19	„ 23	14	„ 23	4	„ 22	31
„ 29	14	„ 30	10	„ 30	4	„ 29	30
Feb. 5	12	May 7	11	Aug. 6	6	Nov. 5	21
„ 12	12	„ 14	4	„ 13	7	„ 12	10
„ 19	9	„ 21	2	„ 20	8	„ 19	20
„ 26	15	„ 28	1	„ 27	7	„ 26	17
Mch. 5	12	June 4	3	Sept. 3	23	Dec. 3	20
„ 12	9	„ 11	6	„ 10	15	„ 10	20
„ 19	8	„ 18	4	„ 17	13	„ 17	18
„ 26	2	„ 25	1	„ 24	18	„ 24	14
April 2	6	July 2	4	Oct. 1	21	„ 31	18
Total...	143	Total...	79	Total...	134	Total...	286

City Total 642

1898.—ENTERIC FEVER ATTACKS.—RATES PER 1,000 LIVING, COMPARED
WITH MEAN OF FIVE YEARS.

	1893	1894	1895	1896	1897	Mean	1898
Twelve Notification Towns...	1·85	1·32	1·45	1·38	1·32	1·46	1·53
City of Manchester	1·19	0·88	0·94	0·95	0·94	0·98	1·19
Manchester Township.....	0·93	1·04	0·70	0·88	0·81	0·87	1·29
North Manchester	1·08	0·73	0·98	1·11	0·97	0·97	1·42
South Manchester	1·42	0·86	1·06	0·91	0·99	1·05	0·99

ENTERIC FEVER ATTACKS IN DISTRICTS, WITH ATTACK RATE, CASE
FATALITY PER CENT., AND REMOVALS TO HOSPITAL PER CENT.

DISTRICTS	ATTACKS	ATTACK RATE PER 1,000 LIVING	† CASE FATALITY PER CENT.	REMOVALS TO HOSPITAL PER CENT.
Ancoats	53	1·17	26·4	75·5
Central	38	1·06	18·4	73·7
St. George's	96	1·50	20·8	81·4
Cheetham	44	1·40	15·9	56·8
Crumpsall	4	0·40	25·0	75·0
Blackley	9	1·10	11·1	33·3
Harpurhey	16	1·28	25·0	31·3
Moston	12	1·76	25·0	58·3
Newton Heath	56	1·49	14·3	67·8
Bradford	37	1·59	18·9	45·9
Beswick	19	1·73	10·6	52·6
Clayton	9	2·12	11·1	33·3
Ardwick	45	1·19	20·0	48·9
Openshaw	45	1·41	20·0	62·2
Gorton (West)	42	1·49	14·3	83·3
Rusholme and Kirk...	11	0·55	18·2	9·1
Chorlton-on-Medlock..	33	0·53	15·2	39·4
Hulme	73	1·02	20·5	54·8
City of Manchester.	642	1·19	18·8	61·7

† Corrected ; the fatal cases are those actually occurring amongst the cases notified.

ENTERIC FEVER.—ATTACKS, DEATHS, AND CASE FATALITY PER CENT. AT DIFFERENT AGES.

AGES	ATTACKS	DEATHS	CASE FATALITY PER CENT.
Under one year.....	...	...	...
1 to 2 years	4	1	25·0
2 to 3 „	4	1	25·0
3 to 4 „	15	...	...
4 to 5 „	16	2	12·5
5 to 6 „	17	2	11·8
6 to 7 „	15	2	13·3
7 to 8 „	9	...	...
8 to 9 „	16	2	12·5
9 to 10 „	13	...	...
10 to 15 „	79	11	13·9
15 to 20 „	110	23	20·9
20 to 25 „	119	26	21·9
25 to 35 „	137	30	21·9
35 to 45 „	67	16	23·9
Over 45 „	21	5	23·8
All ages.....	642	121	18·8

ENTERIC FEVER, 1891-98. ATTACKS, DEATHS, AND CASE FATALITY PER CENT. AT DIFFERENT AGES.

AGES	ATTACKS	DEATHS	CASE FATALITY PER CENT.
Under one year.....	6	4	66·7
1 to 2 years	26	8	30·8
2 to 3 „	51	8	15·7
3 to 4 „	81	16	19·8
4 to 5 „	125	14	11·2
5 to 6 „	136	18	13·2
6 to 7 „	125	14	11·2
7 to 8 „	119	13	10·9
8 to 9 „	133	10	7·5
9 to 10 „	127	13	10·2
10 to 15 „	729	89	12·2
15 to 20 „	810	161	19·9
20 to 25 „	688	137	19·9
25 to 35 „	799	213	26·6
35 to 45 „	407	137	33·6
Over 45 „	238	93	39·1
All ages	4,600	948	20·6

ENTERIC FEVER MORTALITY.—RATE PER 1,000 LIVING, COMPARED WITH
MEAN OF FIVE YEARS.

	1893	1894	1895	1896	1897	Mean	1898
England and Wales	0·23	0·16	0·17	0·17	0·16	0·18	0·18
London.....	0·16	0·15	0·14	0·13	0·13	0·14	0·14
Dublin	0·80	0·42	0·29	0·45	0·58	0·51	0·49
City of Manchester	0·25	0·17	0·18	0·22	0·18	0·20	0·22
Manchester Township	0·18	0·23	0·18	0·28	0·17	0·21	0·25
North Manchester	0·27	0·14	0·16	0·18	0·20	0·19	0·24
South Manchester	0·27	0·16	0·19	0·20	0·17	0·20	0·19

It will be seen from the table given under the head “ Infectious Diseases ” that in spite of the increase of the disease, the number of cases accepted being higher than in any year since 1891, the proportion of attacks to the population is considerably less than in the 12 towns with which it has been usual to make a comparison (see page 69). These are largely afflicted with the same methods of collecting excreta which prevail in Manchester.

The death-rate does not bear to that of the country generally the same favourable relation that it has done during the last few years.

The type of the disease in 1898 was severe, as may be seen from these figures :—

NO. OF DEATHS PER 100 CASES REPORTED.							
1891	1892	1893	1894	1895	1896	1897	1898
21·6			19·6	18·9	24·2	17·9	18·8

Although severe, absolutely, however, it is not severe as compared with previous years. The Manchester type of enteric fever would seem to be a severe one.

The figures of 1897 and 1898 are, of course, more reliable than those of previous years, owing to the bacteriological examination to which they are subjected. Still, this much we may regard as proved. As far as it goes, this points, I think, to the cases being derived from local infection of soil.

As regards the age fatality of enteric fever, the tables show that it is most severe in infancy, the severity diminishing up to the ages 8 to 9, and then increasing with advancing years.

Treatment in hospital.—A further advance has been established in 1898 on the number of cases treated in hospital, which now reach the high percentage 61·7 of the total.

The disease in 1898, with the exception of the districts of Cheetham and St. George's, will be seen to have had the greatest incidence on a continuous area comprising Moston, Newton Heath, Bradford, Clayton, Beswick, West Gorton, and Openshaw.

These may be described as making up a midden area. It is true that Rusholme is also a midden area, but it contains a large number of well-to-do people who are not restricted to middens.

Supposing enteric fever to be perpetuated in the soil through the excreta, it is evident that, *other things being equal*, the best midden district should suffer more than the worst pail-closet district.

Now the midden districts in Manchester are the outlying districts, which, on all accounts but one, should suffer less than the central districts, which are served mainly by pail-closets. It is, therefore, of considerable interest to see which districts suffer most in successive years. Taking, then, the first eight districts in successive years, and placing them in a descending series, we get the greatest incidence in :—

1891 } West Gorton, Openshaw, Central, Bradford, Newton Heath,
1892 }
1893 } Ardwick, Hulme, Harpurhey.

1894—West Gorton, Central, Ancoats, Clayton, St. George's, Cheetham, Hulme, Beswick.

1895—West Gorton, Openshaw, Beswick, Rusholme, Newton, Hulme, Bradford, Harpurhey.

1896—Beswick, Clayton, Harpurhey, Moston, Bradford, Hulme, Openshaw, Central.

1897—Openshaw, West Gorton, Blackley, Moston, Newton Heath, Cheetham, Hulme, Central, Bradford, and Ancoats.

1898—Clayton, Moston, Beswick, Bradford, St. George's, Moston, West Gorton, Openshaw, Cheetham.

The disease is clearly propagated from year to year in West Gorton and Openshaw, where it has strongly established itself. The other districts where it continues to repeat itself to an excessive extent are Bradford, Beswick, Newton Heath, Clayton, Hulme, Harpurhey, Central, Ancoats, St. George's, Cheetham, Moston.

Bradford and Hulme appear 5 times out of 6 in this list ; Central, Newton Heath, and Beswick 4 times ; Harpurhey, Clayton, Cheetham, and Moston 3 times. Thus, with the exception of Hulme and the Central District, the worst districts, and those which are subject to most frequent repetition of excessive incidence, are the outlying midden-containing districts.

PAIL-CLOSETS WITHOUT A GUIDE.

Adjoining the house			Within 4 feet			Over 4 feet distant		
Floor dry	Floor wet	Other-wise defective	Floor dry	Floor wet	Defec-tive	Floor dry	Floor wet	Defec-tive
8	1	0	3	0	0	14	2	0
9			3			16		

Total, 28.

There are thus $28 + 27 = 55$ at the time of inspection presenting conditions more than usually favourable to the propagation of disease.

MIDDEN PRIVIES.

Adjoining the house,	Within 6 feet,	Over six feet distant,
29	14	79

Total.....122.

Water-closets alone,	Water-closets with pail,	Water-closets with midden,
90	8	5

Total.....103.

Total closets recorded.....636.

Now the number of closets recorded for 1898 was :—

Pails,	Midden Privies,	Wet Middens,	Dry Middens,	Water-closets,	Cesspools,
76,663	22,935	12,161	743	35,807	90

If we regard the traced cases as only exceptionally conveyed by way of the closet, we must remove the corresponding closets from the above.

The figures may then be re-written, thus :—

CLOSETS IN ENTERIC CASES.

Pails,	Midden Privies,	Water-closets,
411	122	103

CLOSETS IN TRACED ENTERIC CASES.

Pails,	Midden Privies,	Water-closets,
78	122	18

CLOSETS IN UNTRACED CASES.

Pails,	Midden Privies,	Water-closets,
333	91	85

It will be seen that the number of middens is somewhat in excess of the number of pails in proportion to the total numbers of the respective kinds of closet. In previous reports, I have shown that both pails and middens are instrumental in conveying the disease—pails by transference, and middens by resuscitation of old infection in the autumn. These conclusions have been drawn from the consideration of the number of pail-closets and middens respectively connected with cases of enteric fever in successive months, and for the sake of completeness I give this table for the year 1898 :—

STATEMENT OF PAIL-CLOSETS, MIDDENS, &c., ATTACHED TO HOUSES
IN WHICH ENTERIC FEVER HAS OCCURRED.

	Jan.	Feb.	Mar.	April	May	June	July
Pails	37	30	19	34	11	13	9
Middens	14	8	11	4	4	2	4
W.C.'s	10	7	4	4	4	—	4
Pails and W.C.'s	—	—	—	4	—	—	—
Middens and W.C.'s...	—	2	—	—	—	—	—
	Aug.	Sept.	Oct.	Nov.	Dec.	Total	
Pails	26	46	86	52	49	412	
Middens	4	15	21	17	15	119	
W.C.'s	4	10	28	10	10	95	
Pails and W.C.'s	2	2	2	—	1	11	
Middens and W.C.'s...	1	—	1	—	1	5	

There can be no doubt, I think, that the bacillus of typhoid fever persists especially in the neighbourhood of middens, grows near and on the surface rapidly under favourable conditions, and that in some way it causes the disease. But how? Several hypotheses are tenable. One is that it grows on the surface of the closet seat, gets handled, and so infects the food. This hypothesis as a usual occurrence is scarce tenable. If this were the case, it would be not infrequent to have several members of a family taking the disease about the same time, without any previous case being ascertainable. Now this does happen, but with such extreme rarity as to come within the error of observation. However, in one instance which pointed strongly in this direction, where a number of persons were affected, I had material taken from the closet seat and submitted to Professor Delépine, who did not isolate the bacillus from it, although great pains were taken by him in the matter. The material was, however, not carefully taken.

The inquiry which I have made into meteorological conditions again suggests strongly that the growth is dried and dispersed in the atmosphere before infection occurs. But if this be so, how is the infection received? Directly by the respiratory passages, or indirectly by food on which the germs have lighted and multiplied? It is generally assumed that the infection must be swallowed, and that it begins to grow in a portion of the bowels. The not unfrequent commencement of the disease with acute pneumonia may be supposed to favour the view that sometimes, at all events, it may enter the system by way of the lungs.

If, however, we consider the ease with which the bacillus can grow on a variety of soils the other hypothesis must be regarded as having the greater degree of probability.

On that view, however, we should expect the disease to be very persistent in its recurrences in certain localities where conditions favourable to its growth are present, but not to show a very strong tendency to recur in the same house, which is precisely what happens, its tendency to recur in a locality being much stronger than its tendency to recur in a house.

Other questions are suggested by these, which are of practical moment. What, however, stands out as a clear and safe inference is this: that the present modes of collecting excreta, especially in the outlying districts, should be replaced by water-closets, and that the surface of the soil near houses should be rendered impermeable to damp.

But although there can be no doubt as to the recurrence of enteric fever as the result of growth in certain polluted soils, there are other channels by which the disease arrives.

The chief of these are probably water and milk. In the last Report I showed that direct infection was a very potent element in the spread of typhoid fever. There can be no doubt whatever that contaminated shell-fish

have served to distribute the infection, and there is reason for believing that contaminated watercress has also been responsible for a certain amount of infection.

As regards water, many outbreaks have been traced to contaminated water, and there is no doubt that, short of epidemic prevalence, the disease is often spread in a sporadic manner by a polluted water supply. In the case of Manchester, the investigation of the influence of the water supply is by no means a difficult matter, owing to the fact that Manchester supplies a number of districts with water. Any influence exerted by the water supply would thus be perceived in a number of districts.

Using the differential method in his paper on the effects of pollution of water supplies in the *Medical Chronicle*, April, 1899, Professor Delépine gives the following table, from which he concludes that “such comparison in the case of Manchester, Salford, Eccles, Altrincham, and Bowdon shows that Manchester water cannot be blamed for the high mortality from continued fever.”

MANCHESTER WATER SUPPLY.
(From Longdendale Valley and Lake Thirlmere).

	YEAR	POPULA- TION	DEATHS FROM ALL CAUSES	ZYMOTIC DEATHS	“FEVER” DEATHS	DEATHS FROM ALL CAUSES TO 1 DEATH FROM TYPHOID
Salford, 5 years—Annual Summary, R.G.....	1892	201,058	...	...	...	...
	1896	210,707	23·9	4·20	0·39	60·46
	1897	...	23·9	5·50	0·31	76·95
Manchester, 5 years— Annual Summary, R.G.	1892	510,998	} 23·8	3·24	0·22	106·27
	1896	529,561		3·81	0·19	121·50
	1897	...	23·1	3·81	0·19	121·50
Eccles, 5 years—Dr. Ser- geant’s Annual Reports	1892	30,600	...	...	...	...
	1896	33,800	16·14	2·24	0·18	89·66
Altrincham, 5 years—Dr. Vacher’s Annual Reports	1892	12,611	...	...	...	...
	1896	13,212	18·4	1·94	0·077	238
Bowdon, 5 years—Dr. Vacher’s Annual Reports	1892	2,850	} 10·8	0·74	0·07	152
	1896	2,890		0·74	0·07	152

Generally low, or moderately low mortality from fever, except in Salford.

Milk Supply.—In the same way, we cannot possibly blame the milk supply either directly or indirectly.

Ice Creams.—I can produce no evidence which would justify me in supposing that enteric fever had been propagated by the use of contaminated ice creams. Probably this is due to inability to get at the facts.

Shell-fish.—The most conclusive evidence connecting typhoid fever with the consumption of shell-fish has been afforded by Professor Conn, of the

University of Connecticut, Ohio, and by Dr. Seaton Buchanan, of the Local Government Board, in his investigation into cases of enteric fever following the consumption of Brightlingsea oysters. Dr. Bulstrode's report on "Oyster Culture in England" portrayed conditions in many English layings which, if the oyster can convey enteric fever, ought to have ensured the occurrence of infection.

Dr. Newsholme has furnished facts indicating the conveyance of infection by contaminated oysters; and Dr. Jasper Anderson, of Blackpool, has given good reason for believing that the consumption of Blackpool mussels has been responsible for the spread of the disease.

I have, therefore, collected the facts for 1898 as regards Manchester.

They create, as heretofore, an impression that shell-fish cannot be dismissed as a possible cause of the disease, although, in the absence of a knowledge of the extent to which shell-fish are used, they furnish nothing in the nature of proof.

It is singular that the shell-fish connected with these cases, which have been partaken of outside of Manchester, have been in six out of seven instances eaten in Blackpool. Large numbers of Manchester holiday makers go to Cleethorpes, Southport, the Isle of Man, and other places.

1898.—ENTERIC FEVER.

SHELL-FISH WHICH COULD HAVE CAUSED DISEASE.

Mussels.

No.	Was the sick person the only one?	Interval	Where partaken of
44	No. Brother.	? Frequently.	Manchester.
49	No. Husband.	During 2 weeks before illness	do.
71	No. Husband.	Within 8 days before illness	do.
82	No. ?	? Taken often.	do.
117	Yes.	4 days.	do.
167	?	?	do.
180	Yes.	? Frequently.	do.
269	Yes.	? About 2 weeks.	do.
314	Yes.	4-7 weeks before onset.	Blackpool.
372	Yes.	1 month.	Manchester.
380	Yes.	4 days.	do.
382	Yes.	7-8 days.	do.
403	No. Friend who died 35 days after.	24 days.	Blackpool.
457	No. Brother (6 days after onset).	9 days.	Manchester.
522	Yes.	9 days.	do.
536	Yes.	About 5 weeks ago.	do.
549	Yes.	11 days.	do.
555	Yes.	17 days.	do.
559	No. Family.	8 days.	do.
570	No. Brother.	Raw, 15 days; Cooked, 6 days.	do.
638	Yes.	12 days.	do.

Oysters.

88	Yes.	Almost daily.	Manchester.
141	No. Wife.	Same day.	do.
181	No. ?	? About a week.	do.
214	No. Family.	14 days.	do.
269	Yes.	2 or 3 weeks.	do.
283	Yes.	Twice a week for several weeks.	do.
313	No. Wife.	25 days.	do.
326	No. ?	About 12 days.	Blackpool.
336	Yes.	23-28 days.	do.
340	Yes.	33 days.	Southport.
368	Yes.	20 days.	Manchester.
403	No. Friend who died 35 days after.	24 days.	Blackpool.
470	No. Brother (Mussels only).	Oysters, 6 days; Mussels, after onset.	Manchester.
583	Yes.	Regularly.	do.
624	No. Wife.	7 days.	do.
<i>Indefinite.</i>			
154	Yes.	About 2 weeks.	Manchester.
402	Yes.	Oysters and Mussels, 8-13 days.	Blackpool.
407	Yes.	Oysters. ? 3-9 days.	Manchester.

Watercress.—The subject has not been investigated.

Direct Infection.—As in 1897, direct infection has played a most conspicuous part in the spread of the disease. It has appeared worth while once more to give as full an account as we possess of these cases. Last year it was pointed out that in the great majority of second cases there had been intimate exposure to infection from the first case. Whether, however, this was due to infection by the respiratory passages or to contamination of food there was no means of determining. Judging, however, by the history of infection in hospital, it is difficult to avoid suspecting the former channel. A number of probationers contracted enteric in Monsall in the end of 1897 and the beginning of 1898. In another hospital a number of nurses contracted the fever in 1897.

In still a third institution in 1897 a number of boys were infected, presumably by the means of two infected closets. It is somewhat difficult to suppose that all these persons put their hands or their fingers in their mouths after attendance on the patients without cleansing them. Their own food was not exposed to contamination, and one would suppose that they would for the most part wash their hands before meals. Still, this is by no means certain.

Facts such as the foregoing are susceptible of interpretation as a matter of carelessness in putting hands contaminated with the infection to the mouth. It is possible also to interpret the infection which occasionally occurs among laundresses in the same manner, but it is more difficult to interpret the cases collected by Dr. McNeill, the Medical Officer of Health for Argyleshire, in which the disease appeared to have been carried from one house to another, sometimes at a considerable distance, through the means of infected clothing. The subject is certainly one deserving of careful study, and no doubt a more careful individual study of the facts of infection, such as I am not in a position to make, should serve to throw fresh light on it.

The facts relating to direct infection as exhibited in the following table are these.

The source of infection was traced in 127 instances, or in one-fifth of the total number reported. It is a remarkable proportion in view of the variety of channels through which enteric infection arrives. It appears impossible to doubt, having regard to the number of cases so slight as to be entirely overlooked in the first instance whose illness has been defined by the serum test, that many more such occurrences must altogether escape detection. If this be so in the home, where the course of events can be traced, then it cannot be doubted that the school, workshop, and factory are also responsible for a considerable amount of direct infection.

From an analysis of the table we find that no fewer than 39 appear to have been due to infection from overlooked cases, while this is certainly true with regard to 21 of the cases.

There is thus in this, as in other infectious diseases, an element which we have no means of dealing with, not insignificant in amount, but apparently smaller than is the case with other infectious diseases.

No stronger argument could well be adduced in favour of such an aid to early diagnosis as the serum test than a table such as that here given, nor can it be doubted that the general use of the test is instrumental in reducing the number of overlooked cases, especially with the facilities here given to medical men to use the test as a confidential consultation.

It is unfortunate that the extent to which subsequent cases had been exposed to infection in the sick room have not been always or even generally inquired into, but the circumstances are such as to make it quite certain that such exposure had almost always occurred.

The mark ‡ in the following table indicates that the link of infection is insufficiently made out. The number of such cases is 13.

The mark + indicates : Bacteriological Examination Positive.

The mark — indicates : Bacteriological Examination Negative.

The mark ○ indicates : No Specimen taken.

LIST OF CASES TRACED TO DIRECT INFECTION IN 1898.

Person infected			Source of Infection		Interval	Remarks
No.	Age	Sex	Relative	Other		
12	9	m. +	Brother .....	.....	18 days	Visited the sick room.
15	23	f. +	Other cases in same hospital.....	.....	.....	Hospital nurse.
24	43	m. +	Daughter .....	.....	12 days	Daughter overlooked.
26	13	m. +	Father .....	.....	2 months	Several weeks in the same bedroom with her father.
36	16	f. O	† Sister .....	.....	6 days	Same room with sister.
37	2	f. O	† Sister .....	.....	11 days	Same room with sister.
						These three cases occur within so short an interval as to excite suspicion of a common origin.
43	11	m. +	Father .....	.....	54 days	Frequently in father's sick room.
45	33	m. +	{ Son .....	... ..	86 days	{ No history.
			{ Daughter .....	.....	14-21 days	
50	17	f. +	Sister { No test } .....	.....	} 70 days	{ Another sister 28 days, brother 29 days.
51	8	m. +	Sister { taken } .....	.....	
53	13	m. +	Mother .....	.....	?	Attack in mother overlooked.
55	13	f. +	Sister .....	.....	7 days	Slept together.
59	18	f. +	Sister .....	.....	12 days	Slept in the same room.
61	14	f. +	Brother .....	.....	23 days	No history.
62	6	f. +	Sister .....	.....	40 days	Constantly in the sick room.
79	35	m. +	Sister .....	.....	46 days	Constantly in sick room.
80	3	m. +	Brother .....	.....	19 days	Slept in same room.
87	13	m. +	Brother ..	.....	31 days	Slept together.
92	26	f. +	.....	Lodger	25 days	Had their meals together.
94	5	f. +	Father .....	.....	2 days	No history.
106	19	f. +	Brother .....	.....	29 days	Frequently in the sick room.
122	11	m. +	Previous cases .....	.....	60 and 37 days	No history.
126	44	f. +	Son ..	.....	22 days	Nursed her son.
137	13	f. +	† .....	.....	.....	A child died 2 weeks before of consumption of the bowels.
142	15	f. +	Mother .....	.....	10 days	Assisted in nursing her mother, and slept in the same room.
149	12	m. +	Mother .....	.....	8 to 9 weeks	Mother overlooked.

LIST OF CASES TRACED TO DIRECT INFECTION IN 1898—continued.

Person infected			Source of Infection		Interval	Remarks
No.	Age	Sex	Relative	Other		
161	2	m. +	Mother .. .. .	.....	4 days	Mother overlooked.
153	3	m. +	Sister .. .. .	.....	6 weeks	? No history.
165	26	f. +	.....	Patient	.....	In Crumpsall.
168	19	f. +	Brother .. .. .	.....	28 days	Assisted in nursing her brother.
172	25	f. +	Sister .. .. .	.....	64 days	Slept in the same room.
188	8	f. +	Brother .. .. .	.....	2 days	} Origin of these 3 cases not ascertained.
189	3	m. +	Brother .. .. .	.....	2 days	
190	5	m. +	Brother .. .. .	.....	2 days	
196	39	m. +	Sisters .. .. .	.....	{ 84 days 124 days	} Slept in the same bed.
201	3	m. +	Aunt .. .. .	.....	26 days	(?) No history.
204	26	f. +	Daughter .. .. .	.....	10 days	No history.
208	19	f. +	‡ Sister (?) .. .. .	.....	.....	Sister has had diarrhœa. No history.
209	4	m. +	Mother .. .. .	.....	14 days	Slept in the same room.
213	3	f. +	{ Sister 4 previous cases..... Attendant on above cases	.....	19 days	} All in the same room.
215	12	m. +		.....	.....
216	26	f. +		.....	.....
225	22	f. +	Mother and Sister.....	.....	4 weeks	Previous cases not tested. No history.
226	18	f. O	‡ Brother (?) .. .. .	.....	.....	Brother had influenza—could not get a test. No history.
230	39	f. +	Daughter	Previous case same house	19 days	Nursed her daughter
231	30	f. +	Brother .. .. .	.....	.....	Nursed the brother.
233	8	f. +	Sister .. .. .	.....	.....	Sister returned from Mon-sall 9 days.
238	19	m. +	5 previous cases.....	.....	.....	Slept in the same room.
244	53	m. +	Son .. .. .	.....	30 days	Attack in son overlooked ; same pail-closet used.
246	15	f. +	Brother .. .. .	.....	41 days	} Frequently visited the sick room
247	19	f. +	Brother .. .. .	.....	42 days	
261	28	f. +	Daughter .. .. .	.....	7 days	Nursed the daughter.
267	28	m. +	Wife .. .. .	.....	81 to 53 days	Wife died at home 53 days ago. No history.

LIST OF CASES TRACED TO DIRECT INFECTION IN 1898—*continued.*

Person infected			Source of Infection		Interval	Remarks
No.	Age	Sex	Relative	Other		
287	44	m. +	Wife + .....	.....	6 weeks	Wife's attack been overlooked. No history.
289	4	f. +	} Father	}	3 days	} No history.
290	6	f. +			12 days	
291	10	f. +			13 days	
298	5	m. +	Mother .....	.....	18 days	Slept together.
304	18	m. +	Father .....	.....	17 days	Father + overlooked. No history.
328	10	m. +	.....	Neighbour's children	.....	Case of Enteric removed from next door recently.
330	20	m. +	.....	Lodger	11 days	Slept in same bed.
341	9	m. +	Mother .....	.....	12 days	In daily contact.
348	30	m. +	Brother .....	.....	12 days	Did not wash his hands after emptying stools.
351	38	m. +	‡ Wife (?) .....	.....	.....	Wife died of Quinsy (?) 2 weeks before.
356	32	f. +	Sister's family .....	....	.....	Sister's family was nursed by this case.
359	44	m. +	‡ Son (?).....	.....	.....	Son had Diarrhoea 3 weeks before.
362	21	f. +	Father.....	.....	27 days	Had been in sick room. Enteric pail upset in yard.
373	22	f. +	Mother .....	.....	8 days	Mother overlooked. +
378	30	f. +	Son .....	.....	25 days	Nursed the son.
391	23	f. +	Husband .....	.....	4 days	No history. Husband overlooked.
398	35	m. +	Daughter .....	.....	39 days	Daughter overlooked. No history.
399	19	f. +	Sister .....	.....	37 days	No history.
400	11	m. +	Sister .....	.....	41 days	The three last cases got the disease from a sister whose attack was overlooked.
404	16	m. +	} Brother	}	18 days	No history; 2 bedrooms, 8 in family.
418	15	f. +			22 days	
419	7	f. +			17 days	
425	29	m. —	.....	Previous case lodger	14 days	Slept in the same room.

LIST OF CASES TRACED TO DIRECT INFECTION IN 1898—continued.

Person infected			Source of Infection		Interval	Remarks
No.	Age	Sex	Relative	Other		
426	20	f. ○	Brother +.....	.....	.....	Brother ill 26 days with gastric catarrh; attack overlooked.
445	39	m. +	4 previous cases, 404, 418, 419.....	.....	.....	As above.
450	20	m. +	†Child .....	.....	.....	Child died from diarrhoea 6 weeks before.
454	34	f. +	†Father ? .....	.....	3 weeks	Examination of father's serum. Negative.
457	19	m. +	Brother .....	.....	14 days	These two slept together.
459	3	m. +	†4 previous cases, see 398, 400 .....	.....	.....	This is an overlooked case, and the first of the series; shewn by serum test.
460	12	m. +	Mother .....	.....	3 months	Mother's attack overlooked.
464	8	m. +	Brother .....	.....	9 days	In constant association.
470	22	m. +	Brother .....	.....	Interval between exposure and illness about 10 days	This patient visited his sick brother at another house on occasion of a child's funeral.
472	3	f. +	} †Brother .....	.....	1 day ?	Origin quite undiscovered.
473	1½	m. +				
476	20	f. +	Husband.....	.....	12 days	No history.
488	15	m. +	Brother .....	.....	Removed 34 days ago	Slept in the same bed.
501	12	f. +	Brother .....	.....	3 days	No history.
510	21	m. +	.....	Enteric case	23 days	Sat up all night with a bad case of enteric next door.
526	18	m. +	Mother .....	.....	Over 9 days	No history. Mother died at home.
530	35	f. +	Danghter .....	.....	25 days	Nursed the daughter.
532	33	f. ○	Son +.....	.....	46 days	Nursed her son.
538	12	m. +	{ Sister ? .....	.....	34 days ? 12 days ?	} No history.
			{ Mother ?.....	.....	
539	22	m. +	†Mother ?.....	.....	.....	Mother had diarrhoea 4 weeks before.
550	14	f. +	†Mother ? .....	.....	About 56 days	Mother has had gastric catarrh and influenza. These two slept together.
557	15	m. +	} Sister .....	.....	?	{ Sister's attack overlooked. No history.
558	5	f. +				

LIST OF CASES TRACED TO DIRECT INFECTION IN 1898—*continued.*

Person infected			Source of Infection		Interval	Remarks		
No.	Age	Sex	Relative	Other				
560	11	f. +	Sister .....	....	52 days	Has had food in the sick room.	
568	6	f. +	Sister .....	.....	18 days	In same room.	
576	13	m. +	Brother .....	.....	13 days	Slept in the same bed.	
577	18	m. +	Brother .....	.....	14 days	Slept in the same room.	
589	42	f. +	.....	Neighbour	.....	Acted as nurse to neighbour.
594	8	f. +	Sister .....	.....	21 days	Sister overlooked. No history.	
604	16	m. +	Sister ..	.....	48 days	No history.	
613	3	m. +	Sister .....	.....	4 days ?	Slept together.	
618	9	f. +	} Brother .....	.....	13 days	{ No history. Overlooked first case.	
617	7	m. +						
626	15	f. +	} Brother .....	.....	{ 26 days 26 days 33 days	{ Constantly in the same room.	
627	22	m. +						
628	23	m. +						
630	11	m. +	} Brother, 629 .....	.....	{ 7 days 15 and 8 days 15 and 8 days	{ All in the same room. 2 bedrooms. 9 of a family.	
631	8	f. +					{ Brother, 629	}
632	4	f. +					{ Brother, 630	
							Brother	
633	13	m. +	Brothers, 629, 630, &c.	.....	15 and 8 days	No history.	
643	34	f. +	Brother .....	.....	3 days	Constantly together.	
644	32	f. +	Brothers, 629, &c. ....	.....	20, 13, and 15 days	Nursed previous cases	
645	5	f. +	4 Brothers, 629, &c. ....	.....	.....	Same family as last case.
647	15	f. +	Mother, 646 .....	.....	27 days	Mother overlooked.	
648	13	f. +	Mother and sister, 646...	.....	59 and 32 days		
649	7	f. +	Mother and 2 sisters, 646	.....	98, 71, and 40 days	Same as last case.	

The following cases are also of interest in connection with methods of infection :—

Case.

- 40 } Contracted in a general hospital.
41 }
- 42 This was an overlooked case, from which two cases in 1897 contracted the disease.
- 76 Sister who lives at a distance has had enteric. Said to have been no connection.
- 93 A case occurred in this house 12 months before.
- 100 A case occurred in this house 3 years before.
- 113 A case of enteric in same street had used the closet before being removed to hospital ; dates not given.
- 118 Wife ill with “influenza” at the same time.
- 164 Said to have contracted the disease through emptying the motions of a case of enteric fever at another house ; date not given.
- 234 Case at this house 3 years ago.
- 249 Case at this house 4 years ago.
- 264 Case at this house $1\frac{1}{2}$ years ago.
- 266 Case at this house 8 years ago.
- 311 Case next house 3 years ago.
- 347 Case same house 6 years ago.
- 374 Mother had assisted in nursing two enteric cases.
- 380 Case in same house 3 years before.
- 431 Two workmates have been off ill with diarrhoea.
- 441 Preceded by illness of mother.
- 448 Father had diarrhoea about the same time.
- 475 Lost a child from “pneumonia.” There have been two cases here.
- 491 Brother died of enteric fever 12 months ago in the same house.
- 494 Patient’s husband works at nightsoil works and removed the stools of enteric cases within a month of his wife’s illness.
- 495 Two lodgers who have had enteric were discharged from Monsall 19 days before the illness of this child.
- 546 Two lodgers had diarrhoea some weeks before.
- 551 A patient who has recently had enteric used the closet which is common to two houses.
- 591 Sister was ill two months ago of “pneumonia.”

Total, 27 cases.

MEASLES.

The following are the rates of mortality for 1898, compared with the mean of the previous five years :—

1898—MEASLES MORTALITY.—RATE PER 1,000 LIVING, COMPARED WITH MEAN OF FIVE YEARS.

	1893	1894	1895	1896	1897	Mean	1898
England and Wales	0·37	0·39	0·37	0·56	0·40	0·42	0·41
33 Great Towns	0·44	0·63	0·53	0·71	0·55	0·57	0·56
London	0·38	0·76	0·60	0·82	0·43	0·60	0·69
City of Manchester...	0·57	0·42	0·96	1·05	1·17	0·83	0·50
Manchester Township ...	0·86	0·26	0·94	1·89	1·69	1·13	0·48
North Manchester	0·63	0·30	0·70	1·01	0·63	0·65	0·56
South Manchester	0·35	0·60	1·11	0·57	1·18	0·76	0·48
67 Smaller Towns	0·51	0·31	0·38	0·64	0·43	0·45	0·41
Rural Districts	0·27	0·24	0·26	0·43	0·29	0·30	0·31

The deaths from Measles in districts are as follows :—

1898—DEATHS AND DEATH-RATE FROM MEASLES IN THE VARIOUS DIVISIONS OF THE CITY.

Statistical Divisions	Estimated Population	Deaths	Death-rate
City of Manchester	541,296	271	0·50
I. Manchester Township ...	145,208	70	0·48
II. North Manchester.....	144,879	81	0·56
III. South Manchester.....	251,209	120	0·48
I. { Ancoats	45,488	35	0·77
{ Central	35,845	17	0·47
{ St. George's	63,875	18	0·28
II. { Cheetham	31,355	12	0·38
{ Crumpsall	9,916	...	...
{ Blackley.....	8,162	...	...
{ Harpurhey	12,529	5	0·40
{ Moston	6,833	1	0·15
{ Newton Heath	37,527	6	0·16
{ Bradford	23,337	41	1·76
{ Beswick	10,976	15	1·37
{ Clayton	4,244	1	0·24
III. { Ardwick	37,817	13	0·34
{ Openshaw	31,961	45	1·41
{ Gorton (West)	28,130	11	0·39
{ Rusholme and Kirk.....	19,830	3	0·15
{ Chorlton-upon-Medlock..	61,851	13	0·21
{ Hulme	71,620	35	0·49

The following are the deaths in quarters, which shows that the disease was most prevalent in the second and fourth quarters of the year :—

1898—MEASLES.—DEATHS IN QUARTERS IN THE CITY AND IN GROUPS OF DISTRICTS.

	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
City of Manchester	42	57	48	124
Manchester Township ...	26	28	5	11
North Manchester	13	21	8	39
South Manchester	3	8	35	74

In the year 1898 a lull occurred in the death-rate from this truly formidable disease, as will be seen from the accompanying tables, which show that the mortality in Manchester for this year was below that of the 33 great towns, and also below that of London. The previous three years, however, witnessed a continuously high mortality. It was in consequence of the high death-rate in 1895 that the policy was commenced of closing the infant department of schools when the number of cases exceeded 10 per cent.

It will not be supposed, however, that this is all that we do. Every case of measles of which we obtain cognisance is visited by a Sanitary Inspector, who endeavours to ensure isolation, and to get proper precautions carried out. As far as possible the action consequent on the notification of other infectious diseases ensues upon a visit to a case of measles. Lately the School Board have sent us daily lists of cases, so that we may take prompter action, although it is too soon to determine what will be the effect of this proceeding on the progress of the disease.

As regards the closing of the infant department of schools, the view taken is this. No circumstances of life outside the school offer anything like the opportunities for personal infection which aggregation in school does. Moreover, the manner in which the disease sweeps through an infant department shows that such is the case. Under these circumstances, a heavy responsibility is thrown on any Sanitary Authority which permits the department affected to remain open, unless it can be shown that the disease spreads outside the school in a manner comparable with what occurs in the school. This, it seems to me, has not been the case.

The following arguments have been used in opposition to school closure :—

The spread of the disease has not been arrested by this procedure. So much must at once be admitted—although it may be reasonably supposed that the progress of the epidemic has been delayed.

The disease is apt to take on a rapid increase when the school opens after the closure period of three weeks. This does, though quite exceptionally, occur, proving in fact that the closing of the school had been of decided effect in stopping the propagation of the disease.

The attendance in the infant department falls off after the re-opening, and takes a considerable time to recover. This, I consider, has been sufficiently proved not to be the case, as the result of the closing order (see Annual Report for 1896).

The disease is liable to be spread to other schools through the parents sending their infants to those schools.

There is certainly some risk of this occurrence, though we take the precaution of warning other schools near the one in which the infant department has been closed not to receive scholars from the infected houses.

It is difficult to avoid thinking that good is effected by school closure, were it only in rousing parents to a sense of the importance of the disease, and in getting schools cleansed and otherwise improved.

I have thought it desirable to enter somewhat more fully into the statistics of measles than usual, in order to see whether anything can be gathered from the distribution of the disease, although to my mind nothing can more completely show the overwhelming influence of aggregation in school in spreading measles than the manner in which the cases rapidly multiply in the infant department of one school, while others in the neighbourhood escape, at all events for a time.

Tables have been prepared showing the birth-rates and death-rates from measles, whooping-cough, and diarrhoea, in each Sanitary District of the City for each of the eight years 1891–1898.

BIRTH-RATES.

STATISTICAL DIVISIONS	1891	1892	1893	1894	1895	1896	1897	1898	Total
City of Manchester	33·83	33·44	33·36	31·79	33·43	32·75	32·86	32·30	263·76
I. Manchester Township	34·74	34·82	35·36	33·44	36·28	35·75	35·10	33·79	279·28
II. North Manchester.....	34·46	33·85	32·24	31·31	32·47	32·58	33·22	33·66	263·79
III. South Manchester	32·92	32·36	32·75	31·06	32·25	31·06	31·35	30·66	254·41
(TOWNSHIPS)									
I. { Ancoats	38·24	37·30	38·13	35·19	39·60	40·41	37·87	38·80	305·54
Central	28·64	29·02	31·11	29·63	30·95	31·22	28·11	27·45	236·13
St. George's	35·84	36·46	35·85	34·39	36·96	34·99	37·07	33·78	285·34
II. { Cheetham	33·03	30·67	31·69	31·24	33·32	33·49	34·38	35·27	263·09
Crumpsall	29·67	28·05	22·87	23·31	22·31	19·88	19·88	19·77	185·74
Blackley	29·96	29·96	28·49	26·68	26·70	26·83	28·17	24·99	221·78
Harpurhey	36·30	34·38	31·21	29·18	33·52	35·39	39·56	41·10	280·64
Moston	27·76	27·80	23·38	27·10	32·94	34·17	34·80	37·32	245·27
Newton	32·67	34·50	33·39	30·51	31·74	30·88	28·73	31·02	253·44
Bradford.....	39·03	38·68	35·41	37·60	36·59	37·04	40·31	36·12	300·78
Beswick	44·36	42·35	39·92	35·02	35·90	36·59	37·08	34·80	306·02
Clayton	34·47	30·23	30·93	32·90	31·06	35·79	35·25	49·72	280·35
III. { Ardwick	35·95	33·21	36·49	33·51	34·10	35·93	36·64	36·86	282·69
Openshaw	34·97	37·09	33·16	33·11	33·67	32·23	30·48	28·88	263·59
West Gorton	37·93	36·70	38·02	35·19	40·05	35·53	34·72	33·88	292·02
Rusholme and Kirk.....	24·87	24·59	24·15	21·95	21·82	23·84	25·39	27·69	194·30
Chorlton-upon-Medlock ...	27·73	27·02	27·87	27·81	28·24	25·77	25·50	24·19	214·13
Hulme.....	35·23	35·09	35·06	32·59	33·96	32·79	34·32	33·34	272·38

DEATH-RATES FROM MEASLES.

STATISTICAL DIVISIONS		1891	1892	1893	1894	1895	1896	1897	1898	Total
City of Manchester		0·43	0·72	0·57	0·42	0·96	1·05	1·17	0·50	5·82
I.	Manchester Township	0·68	1·32	0·86	0·26	0·94	1·89	1·69	0·48	8·12
II.	North Manchester	0·44	0·44	0·63	0·30	0·70	1·01	0·63	0·56	4·71
III.	South Manchester	0·27	0·49	0·35	0·60	1·11	0·57	1·18	0·48	5·05
(TOWNSHIPS)										
I.	{ Ancoats	0·95	0·81	1·20	0·17	0·67	2·11	2·06	0·77	8·74
	{ Central	0·44	1·31	0·53	0·59	1·11	0·82	2·10	0·47	7·37
	{ St. George's	0·62	1·71	0·81	0·13	1·04	2·42	1·19	0·28	8·20
II.	{ Cheetham	0·35	0·31	0·20	0·40	0·13	0·78	0·35	0·38	2·90
	{ Crumpsall	1·58	0·13	0·73	0·12	0·11	0·11	0·21	...	2·99
	{ Blackley	0·42	...	0·40	0·13	0·13	0·13	0·37	...	1·58
	{ Harpurhey.....	0·12	1·21	0·42	...	0·75	1·33	0·59	0·40	4·82
	{ Moston .....	...	0·55	0·18	..	0·49	0·16	0·61	0·15	2·14
	{ Newton	0·58	0·63	0·60	0·20	1·38	0·79	1·00	0·16	5·34
	{ Bradford.....	0·30	0·34	0·90	0·78	0·68	2·67	0·44	1·76	7·87
	{ Beswick	0·30	0·10	2·15	0·19	1·25	0·75	0·65	1·37	6·76
	{ Clayton .....	...	0·57	...	...	...	1·00	1·94	0·24	3·75
III.	{ Ardwick	0·31	0·20	0·58	0·27	1·79	0·54	1·15	0·34	5·18
	{ Openshaw	0·41	1·02	0·45	0·54	1·01	0·77	0·75	1·41	6·36
	{ West Gorton	0·44	0·47	0·62	0·76	0·52	1·36	1·77	0·39	6·33
	{ Rusholme and Kirk.	0·40	0·34	0·28	0·11	0·27	0·73	0·67	0·15	2·95
	{ Chorlton-upon-Medlock ...	0·10	0·37	0·20	0·30	1·26	0·18	0·89	0·21	3·51
	{ Hulme	0·26	0·61	0·25	1·09	1·12	0·53	1·53	0·49	5·88

DEATH-RATES FROM WHOOPING COUGH.

STATISTICAL DIVISIONS	1891	1892	1893	1894	1895	1896	1897	1898	TOTAL
City of Manchester	1·02	0·72	0·46	0·55	0·47	0·66	0·56	0·31	4·75
I. Manchester Township	1·24	0·86	0·64	0·55	0·72	0·92	0·68	0·41	6·02
II. North Manchester	0·72	0·60	0·28	0·45	0·37	0·50	0·29	0·14	3·35
III. South Manchester	1·04	0·69	0·45	0·60	0·38	0·60	0·64	0·36	4·76
(TOWNSHIPS)									
I. { Ancoats	1·21	0·77	0·53	0·80	0·41	1·30	0·66	0·46	6·14
Central	1·04	1·10	0·32	0·40	0·32	0·82	0·66	0·14	4·80
St. George's	1·38	0·78	0·52	0·46	1·17	0·74	0·71	0·53	6·69
II. { Cheetham	0·21	0·41	0·20	0·33	0·16	0·20	0·26	...	1·77
Crumpsall	0·26	0·76	0·12	0·23	0·56	0·43	0·42	...	2·78
Blackley	0·83	0·14	0·40	0·26	0·52	0·13	0·12	...	2·40
Harpurhey.....	1·40	1·10	0·84	0·30	0·66	0·62	0·59	0·08	5·59
Moston	1·53	1·10	0·53	...	0·49	0·16	0·61	0·29	4·71
Newton	0·61	0·92	0·31	0·31	0·39	0·74	0·11	0·24	3·63
Bradford.....	1·33	0·34	0·09	1·06	0·41	0·76	0·52	0·26	4·57
Beswick	0·81	0·20	0·20	0·58	0·38	0·47	0·09	0·18	2·91
Clayton .....	...	0·29	0·28	0·80	...	0·75	...	...	2·12
III. { Ardwick	1·64	0·70	0·47	0·82	0·49	0·89	0·80	0·29	6·10
Openshaw	1·30	0·47	0·15	0·83	0·28	0·51	0·55	0·19	4·28
West Gorton	0·88	0·82	0·58	0·49	0·22	0·59	0·87	0·43	4·88
Rusholme and Kirk.....	1·09	0·34	0·50	0·43	0·16	0·57	0·62	0·55	4·26
Chorlton-upon-Medlock ...	0·67	0·63	0·26	0·51	0·10	0·42	0·32	0·34	3·25
Hulme	1·00	0·85	0·65	0·55	0·73	0·69	0·78	0·40	5·65

DEATH-RATES FROM DIARRHŒA.

STATISTICAL DIVISIONS	1891	1892	1893	1894	1895	1896	1897	1898	Total.
City of Manchester	0·81	0·79	1·75	0·70	1·66	1·04	1·74	1·96	10·45
I. Manchester Township	1·08	1·08	2·22	1·11	2·20	1·43	2·33	2·58	14·03
II. North Manchester	0·70	0·68	1·49	0·52	1·38	0·79	1·48	1·62	8·66
III. South Manchester	0·69	0·67	1·59	0·54	1·50	0·94	1·54	1·79	9·26
(TOWNSHIPS)									
I. { Ancoats	1·14	1·23	2·72	1·25	2·57	1·67	3·24	2·66	16·48
Central	1·43	1·02	1·96	1·18	1·89	1·67	1·71	2·65	13·51
St. George's	0·81	1·00	2·01	0·98	2·10	1·13	2·02	2·49	12·54
II. { Cheetham	0·42	0·48	0·88	0·30	1·32	0·74	1·00	0·73	5·87
Crumpsall	0·92	0·38	0·97	...	0·79	0·32	0·52	0·40	4·30
Blackley	0·14	0·41	0·94	0·13	0·39	0·12	0·37	0·37	2·87
Harpurhey	0·23	0·33	0·94	0·30	1·31	0·96	2·19	2·24	8·50
Moston	0·38	0·55	0·71	0·34	...	0·31	0·76	2·34	5·39
Newton	0·67	0·75	1·71	0·67	1·19	0·65	1·27	1·55	8·46
Bradford.....	1·48	1·21	3·07	0·97	2·41	1·32	2·71	3·04	16·21
Beswick	1·02	0·60	0·78	0·68	1·63	1·02	2·04	1·64	9·41
Clayton	0·29	1·14	2·21	0·80	2·85	1·73	2·19	3·30	14·51
III. { Ardwick	1·02	0·53	1·44	0·47	1·31	0·88	1·36	2·33	9·34
Openshaw	0·41	0·71	2·48	0·54	1·78	1·03	1·62	2·25	10·82
West Gorton	0·96	0·67	2·01	0·68	2·58	0·98	1·91	2·74	12·53
Rusholme and Kirk.	0·34	0·90	1·21	0·27	1·17	0·51	0·82	1·36	6·58
Chorlton-upon-Medlock ...	0·47	0·73	1·34	0·26	0·95	0·85	0·83	0·91	6·34
Hulme.....	0·80	0·63	1·49	0·83	1·62	1·11	2·27	1·82	10·57

When this is done, and the death-rates added up, we find that the aggregate mortality is much greater in some districts than in others, and not only so, but there is a general tendency for the death-rate to be highest in the Central division of the City, that is to say, in the Manchester Township.

What are the causes likely to lead to such differences in the mortality? Amongst the first that suggests itself is the greater number of young children in some districts than in others. This is a cause which can be measured by preparing a table of birth-rates in the same years for each of these sanitary districts. This has accordingly been done. Then again, the same consideration applies to whooping cough and summer diarrhoea, and a table of death-rates from these diseases has also been prepared and placed side by side with the table for measles.

When this is done, several points at once present themselves.

As regards the chief divisions of the City, the death-rate over eight years from each of these infantile diseases is highest in the Manchester Township, and lowest in North Manchester, nor does the relative positions of the death-rates vary very widely in the three diseases. Herein we see unmistakably the influence of the sanitary conditions under which these children are living and cared for when ill. There is, it is true, a somewhat higher birth-rate in the Manchester Township than in the other divisions of the City, but the differences are trifling compared with the differences in mortality.

It makes no difference in this comparison that there should be an error in regard to the population of one of these districts, since the birth-rates and death-rates will be altered in the same proportion.

If, however, the effect of better sanitary circumstances stands out so unmistakably, can we trace the effect of a larger infantile population at all in these mortality tables? In answer to this, it is seen from the tables that there is some correspondence between a high birth-rate and a high measles mortality, but that this correspondence is not so close in the case of whooping cough and summer diarrhoea as in the case of measles.

The effect of sanitary conditions, therefore, almost entirely overrides the effect of a larger susceptible population.

This naturally suggests a question which has been asked of me. Do you find that schools having better sanitary conditions, as regards crowding and ventilation, suffer less in respect of the incidence of zymotic diseases than less sanitary schools? My answer is a decided affirmative, though of course the vindication of this affirmative would be rather extensive and elaborate.

While, now, insanitary conditions are of great effect in the production of a high mortality in a given district, this effect will not vary much from one year to another, and it will therefore be of interest to study

the growth and decline of the death-rate in the respective districts from year to year. We shall thus be able to see, for one thing, the extent to which this disease, which we know to be diffused with extreme rapidity through the infant department of a school, is spread from district to district, a spread which must, of course, occur outside the school, and also the rate of such propagation. We are here met with a difficulty which I must postpone meeting, in the contiguity to a number of other centres of population from and to which measles is propagated, especially to Salford.

Commencing, however, with those divisions which border on Salford, and premising that the dates here given correspond to the troughs of the waves of mortality, we see that the *Central District* has the following waves:—1891-1893, 1893-1898; the second with a depression in 1896. *Hulme* has these waves:—1891-1893, 1893-1896, 1896-1898. *Cheetham*:—1891-1893, 1893-1895, 1895-1897.

Thus in these three districts, of which the first is contiguous to the last two, we perceive that the waves follow different courses, pointing to local centres of propagation rather than to a gradually spreading wave of disease.

If, indeed, we examine the whole City, we see that from the depth of the wave in 1894 to its top in 1897 is a period of three years. The top of the wave is reached in Ancoats, in the Manchester Township, in 1896, beginning with 1894. In North Manchester also the wave begins in 1894, and reaches its top in 1896.

In South Manchester it begins in 1893, and reaches its crest in 1895. Another wave starting in 1896 reaches its crest in 1897.

Thus, if we assume that the last wave of measles started in the Central District, in Hulme, and in Cheetham in 1893, it took four years to reach its crest in the City generally.

We must broadly conclude that, rapidly as we know this disease to rise and fall in a given limited locality, it does not extend easily or rapidly over extensive areas.

The district next to Cheetham is Crumpsall, in which a considerable outbreak occurred in 1893, when the Cheetham wave was at its lowest point. But Crumpsall remains practically unaffected by the wave in Cheetham during the years 1894-1898.

A still larger wave affected Harpurhey, another district adjoining Crumpsall, in the years 1894-1898.

Now Crumpsall is reached by two sets of trams, one passing through Cheetham and the other through Harpurhey, in which young children must often travel.

This may be taken to show, at all events, that a certain degree of aggregation and appropinquity between the infecting and the infected children is requisite. Going out still further, we see that the disease follows precisely the same course in Blackley and in Crumpsall, with the probable explanation that the children of these two districts go to the same schools.

Looking at the map, now, we see that a certain number of districts lie quite centrally away from adjoining Sanitary Districts, and near each other.

We may conveniently study what happens in these. They are Ardwick, Bradford, Beswick, Ancoats, and St. George's.

We have these waves—

In Ardwick	...	...	1894-1896.
			1896-1898.
In Bradford	...	...	1891-1895.
			1895-1897.
			1897 — top of wave 1898.
In Beswick	...	...	1892-1894.
			1894-1897.
			1897 —
In Ancoats	...	...	1894-1898.
In St. George's...	...	...	1891-1894.
			1894-1898.

We thus see that the waves are entirely different even in these internal districts.

Thus we have in Beswick and Bradford a sharp outburst in 1898 when all the adjoining districts except Openshaw, which comes in between them like a wedge, are exceptionally low, as a comparison of the map and of the figures will show.

In Beswick we have a very sharp outburst in 1893 which leaves all the adjoining districts comparatively unaffected.

Such facts as these, and others of a like nature which result from a study of the figures, appear incompatible with the idea that this rapidly diffusible disease is usually spread in the home, and not rather by aggregation of susceptible children in school or otherwise.

Needless to say, a comparison of the diarrhoea death-rates gives quite other results.

The following schools, or portion of schools, were closed in the course of the year :—

SCHOOL	DEPARTMENT
St. John's Church of England School, Miles Platting.....	Infant
Birley Street Board School, Beswick.....	Do.
Blackley Wesleyan School	Do.
St. Philip's Church of England School, Ancoats... ..	Do.
St. Jude's Church of England School, Ancoats	Do.
Vine Street Board School, Hulme.....	Do.
Lloyd Street Board School, Hulme	Do.
Holy Trinity Church of England School, Rusholme	Do.
Duke Street Board School, Hulme	Do.
St Anne's Roman Catholic School, Higher Openshaw	Whole School
St. Joseph's Roman Catholic School, Chorlton-upon-Medlock	Infant
St. Wilfrid's Roman Catholic School, Hulme	Do.
Ashton Old Road Board School, Openshaw.....	Do.
Grange Street Board School, Bradford.....	Do.
St. Clement's Church of England School, Openshaw	Do.
Openshaw Wesleyan School (Grey Mare Lane)	Whole School
(Infant Department closed again later)	
Varna Street Board School, Openshaw.....	Infant
St. Bridget's Roman Catholic School, Bradford	Do.
Longsight Wesleyan School, Richmond Grove East	Do.
Queen Street Board School, Bradford	Do.
St. Barnabas' Church of England School, Openshaw	Do.
Lees Street Board School, Openshaw	Do.
Memorial Church of England School, Bradford	Do.
St. Clement's Church of England School, West Gorton	Do.

Board Schools	9
Church of England Schools	8
Roman Catholic Schools.....	4
Wesleyan Schools.....	3

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It has been already mentioned that the behaviour of measles as regards its propagation in and out of schools may best be ascertained by taking the weekly returns of families freshly invaded, as given by the Clerk to the School Board, in schools which have been closed, and in the adjoining schools, or schools in the immediate neighbourhood.

For that purpose I have selected four schools which have been closed, and the number of families returned as invaded in these is given week by week.

1.—DERBY STREET JEWS' SCHOOL.

No. 67 on map, page III. in book. Closed January 30th, 1899, for 3 weeks.

		Measles.	Whooping Cough.			Measles.	Whooping Cough.
December	17	5	...	February	4	5	...
	24	1	...		11	1	...
January	7	12	...		18	...	...
	14	12	...		25	1	...
	21	11	...	March	4	...	...
	28	15	...		11	...	...

* School Board Facts, (1) 560, (2) 501, (3) 48, and (4) 7.

ST. CHAD'S ROMAN CATHOLIC SCHOOL.

No. 140 on plan.

		Measles.	Whooping Cough.			Measles.	Whooping Cough.
December	17	...	...	February	4	...	...
	24	...	...		11	3	...
January	7	...	...		18	3	...
	14	1	...		25	1	...
	21	...	...	March	4	...	...
	28	...	...		11	1	...

SOUTHALL STREET BOARD SCHOOL.

No. 54 on plan.

		Measles.	Whooping Cough.			Measles.	Whooping Cough.
December	17	12	...	February	4	3	...
	24	6	...		11	...	...
January	7	6	...		18	4	...
	14	6	...		25	1	...
	21	6	...	March	4	1	...
	28	5	...		11	1	...

WATERLOO ROAD BOARD SCHOOL.

No. 61 on plan.

		Measles.	Whooping Cough.			Measles.	Whooping Cough.
December	17	...	...	February	4	...	...
	24	4	...		11	...	...
January	7	...	...		18	...	...
	14	...	...		25	1	...
	21	3	...	March	4	...	...
	28	...	...		11	...	...

* (1) Average attendance. (2) Present attendance. (3) Actual cases.
(4) Away on account of.

ST. THOMAS'S CHURCH OF ENGLAND SCHOOL.
No. 126 on plan.

		Measles.	Whooping Cough.			Measles.	Whooping Cough.
December	17	2	...	February	4	...	...
	24	1	...		11	...	...
January	7	...	...		18	...	...
	14	2	...		25	...	...
	21	...	...	March	4	...	...
	28	...	...		11	...	...

The first school is the Derby Street Jews' School, and in the vicinity are St. Chad's Roman Catholic School, Southall Street Board School, Waterloo Road Board School, and St. Thomas's Church of England School.

It will be seen that the Southall Street Board School, which is a very large school, is invaded about the same period, though to a slighter extent in proportion to the number of children.

The other three schools are almost free from cases.

On reopening, the disease does not extend.

2.—BANK MEADOW BOARD SCHOOL.

No. 6 on plan, page 17 in book. Closed Feb. 15th, 1899.

		Measles.	Whooping Cough.			Measles.	Whooping Cough.
January	7	...	...	March	4	5	1
	14	...	...		11	2	1
	21	1	...		18	5	1
	28	1	...		25	4	2
February	4	6	...	April	1	0	...
	11	9	1		8	2	...
	18	4	...		15	0	...
	25	7	1				

* School Board Facts, (1) 254, (2) 252, (3) 28, and (4) 8.

ST. SILAS'S CHURCH OF ENGLAND SCHOOL.
No. 123 on plan.

		Measles.	Whooping Cough.			Measles.	Whooping Cough.
January	7	...	...	February	18	...	...
	14	...	...		25	1	...
	21	1	...	March	4	...	1
	28	...	...		11	...	...
February	4	...	...		18	...	...
	11	...	...		25	...	...

* (1) Average attendance. (2) Present attendance. (3) Actual cases.
(4) Away on account of.

CHESTER STREET BOARD SCHOOL.

No. 12 on plan.

		Measles.	Whooping Cough.			Measles.	Whooping Cough.
January	7	...	...	February	18	...	...
„	14	1	...	„	25	...	...
„	21	...	...	March	4	...	...
„	28	1	...	„	11	...	...
February	4	...	...	„	18	...	2
„	11	...	...	„	25	...	...

The second school is the Bank Meadow Board School, and on the other side of Ashton Old Road lies the St. Silas's Church of England School and the Chester Street Board School. It will be seen that these schools were invaded to a very slight extent.

On reopening Bank Meadow Board School on March 6th, the disease does not extend.

3.—BIRLEY STREET BOARD SCHOOLS, BESWICK.

No. 7 on map, page 34 in book. Closed April 20th, 1898.

		Measles.	Whooping Cough.			Measles.	Whooping Cough.
March	5	...	...	April	23	1	...
„	12	...	...	„	30	9	...
„	19	3	...	May	7	6	2
„	26	1	...	„	14	6	...
April	2	4	...	„	21	10	...
„	9	12	...	„	28	3	...
„	16	11	...	June	11	0	...

* School Board Facts, (1) 478, (2) 418, (3) 48, and (4) 11.

ALL SOULS' CHURCH OF ENGLAND SCHOOL.

No. 74 on plan.

		Measles.	Whooping Cough.			Measles.	Whooping Cough.
March	5	...	...	April	16	...	...
„	12	1	...	„	23	2	1
„	19	...	1	„	30	1	...
„	26	1	...	May	7	2	...
April	2	...	1	„	14	1	1
„	9	...	1	„	21	1	...

* (1) Average attendance. (2) Present attendance. (3) Actual cases.
(4) Away on account of.

EVERY STREET BOARD SCHOOL.

No. 19 on plan.

		Measles.	Whooping Cough.			Measles.	Whooping Cough.
March	5	...	...	April	16	1	1
"	12	2	1	"	23	6	5
"	19	1	...	"	30	3	3
"	26	1	1	May	7	3	2
April	2	3	2	"	14	2	1
"	9	4	1	"	21	...	..

ST. ANN'S ROMAN CATHOLIC SCHOOLS.

No. 136 on plan.

		Measles.	Whooping Cough.			Measles.	Whooping Cough.
March	5	...	...	April	16	...	...
"	12	16	...	"	23	...	1
"	19	6	1	"	30	...	...
"	26	6	...	May	7	2	4
April	2	...	..	"	14	1	...
"	9	3	...	"	21	1	1

The earliest date at which fresh cases could occur due to the reopening of the Birley Street Board School on May 11th is May 25th. It will be seen that no subsequent revival of cases took place.

The third school is the Birley Street Board School, and in the immediate vicinity lie the All Souls' Church of England Schools, the Every Street Board Schools, and the St. Ann's Roman Catholic Schools.

From the figures it will be noticed that the Infant Department of the Every Street Board School was affected about the same time as the Infant Department of the Birley Street Board School was closed, although to a limited extent.

The St. Ann's Roman Catholic Schools were invaded earlier—in March; while the All Souls' Church of England School seems to have remained unaffected.

4.—ST. JUDE'S CHURCH OF ENGLAND SCHOOL.

No. 104 on map, page 46 in book. Closed May 23rd, 1898, for three weeks.

		Measles.	Whooping Cough.			Measles.	Whooping Cough.
April	23	2	...	June	4	7	...
"	30	2	...	"	11	1	...
May	7	...	...	"	18	1	1
"	14	15	...	"	25	1	1
"	21	4	...	July	2	1	1
"	28	1	...				

* School Board Facts, (1) 132, (2) 97, (3) 24, and (4) 6.

* (1) Average attendance. (2) Present attendance. (3) Actual cases.
(4) Away on account of.

ST. JAMES'-THE-LESS CHURCH OF ENGLAND SCHOOL.

No. 42 on plan.

		Measles.	Whooping Cough.			Measles.	Whooping Cough.
April	23	...	...	June	4	...	...
"	30	...	...	"	11	...	...
May	7	...	...	"	18	...	...
"	14	...	...	"	25	...	...
"	21	...	...	July	2	...	...
"	28	...	1				

ST. ALBAN'S ROMAN CATHOLIC SCHOOL.

No. 134 on plan.

		Measles.	Whooping Cough.			Measles.	Whooping Cough.
April	23	1	...	June	4	...	...
"	30	...	...	"	11	...	...
May	7	...	...	"	18	1	1
"	14	...	...	"	25	...	...
"	21	...	1	July	2	1	
"	28	...	...		

MILL STREET INDUSTRIAL SCHOOL.

No. 63 on plan.

		Measle	Whooping Cough.			Measles.	Whooping Cough.
April	23	...	...	June	4	...	...
"	30	...	...	"	11	...	...
May	7	...	...	"	18	...	...
"	14	...	...	"	25	...	...
"	21	...	1	July	2	...	...
"	28	1	...				

The fourth school is the St. Jude's Church of England School, the schools in the immediate vicinity being St. James'-the-Less Church of England School, the St. Alban's Roman Catholic School, and the Mill Street Industrial School, all of which seem to have been comparatively free from measles.

A number of other schools might be given showing the same fact, viz., that a considerable incidence may be taking place on one school, while others are being spared or are only slightly affected.

The conclusion which I wish to draw is that the facilities for the spread of the disease are shown to be, as we should anticipate, much greater inside than outside the school.

Although, however, a number of such instances can be given, in other cases the disease has attacked nearly all the schools in some districts during the present epidemic, while in still other cases some schools are attacked and others are only slightly affected.

The conditions of propagation may be likened to a series of little heaps of dry twigs connected by loose straws and scattered dry twigs. A fire is set to one of the heaps, which then blazes up. From thence it extends with varying degrees of speed, or not at all, according to the number of individual connecting straws and twigs. The path of the fire is, however, much less easy and less certain along the connecting branches than in the bundles.

A useful map has been prepared by Mr. Ellwood of all the Board and Voluntary Schools in the City. Each school is numbered in the list of schools given in the Official Handbook, and the number then written on the map. If any portion of the school has been closed a circle is placed round the number, but on account of expense the map has not been reproduced in my report.

WHOOPING COUGH.

The rates giving the Whooping Cough mortality for 1898 are as follows:—

WHOOPING COUGH MORTALITY.—RATE PER 1,000 LIVING, COMPARED WITH MEAN OF FIVE YEARS.

	1893	1894	1895	1896	1897	Mean	1898
England and Wales	0·34	0·39	0·30	0·41	0·35	0·36	0·31
33 Great Towns	0·48	0·48	0·37	0·57	0·41	0·46	0·42
London	0·54	0·48	0·34	0·65	0·41	0·48	0·48
City of Manchester...	0·46	0·55	0·47	0·66	0·56	0·54	0·31
Manchester Township ...	0·64	0·55	0·72	0·92	0·68	0·70	0·41
North Manchester	0·28	0·45	0·37	0·50	0·29	0·38	0·14
South Manchester.....	0·45	0·60	0·38	0·60	0·64	0·53	0·36
67 Smaller Towns.....	0·31	0·39	0·32	0·43	0·38	0·37	0·27
Rural Districts	0·23	0·33	0·25	0·30	0·31	0·28	0·25

The following are the deaths in quarters, which shows that the disease was most prevalent in the first half of the year :—

1898.—WHOOPING COUGH.—DEATHS IN QUARTERS IN THE CITY, AND IN GROUPS AND DISTRICTS.

	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
City of Manchester	52	53	36	29
Manchester Townships...	26	20	10	4
North Manchester	1	4	7	8
South Manchester	25	29	19	17

The following table shows the districts most affected :—

1898.—DEATHS AND DEATH-RATES FROM WHOOPING COUGH IN THE VARIOUS DIVISIONS OF THE CITY.

Statistical Divisions	Estimated Population	Deaths	Death Rates
City of Manchester	541,296	170	0·31
I. Manchester Township.....	145,208	60	0·41
II. North Manchester	144,879	20	0·14
III. South Manchester	251,209	90	0·36
I. { Ancoats	45,488	21	0·46
{ Central... ..	35,845	5	0·14
{ St. George's.....	63,875	34	0·53
II. { Cheetham	31,355	...	...
{ Crumpsall	9,916	...	...
{ Blackley... ..	8,162	...	...
{ Harpurhey	12,529	1	0·08
{ Moston	6,833	2	0·29
{ Newton Heath	37,527	9	0·24
{ Bradford	23,337	6	0·26
{ Beswick	10,976	2	0·18
{ Clayton	4,244	...	...
III. { Ardwick	37,817	11	0·29
{ Openshaw	31,961	6	0·19
{ Gorton (West).....	28,130	12	0·43
{ Rusholme and Kirk.	19,830	11	0·55
{ Chorlton-upon-Medlock	61,851	21	0·34
{ Hulme.....	71,620	29	0·40

When we proceed to examine the statistics for whooping cough, we at once perceive that, at all events as far as mortality is concerned, the relation is **not** quite the same between the main divisions of the City as in measles. Whereas in the case of measles the greatest mortality is now in one division, now in another, in the case of whooping cough it is steadily higher in the Manchester Township than in South Manchester, and almost invariably higher in South Manchester than in North Manchester.

This would indicate either that insanitary conditions tell more powerfully in the case of whooping cough than in the case of measles, or that whooping cough has less tendency to shift about than the other disease. We can to a certain extent differentiate between these explanations by a more detailed examination of the districts. The three districts in the Manchester Township afford an excellent opportunity of doing so, since we may almost put aside in these the factor of sanitary circumstances, as being about equal in the three.

It will be seen, when we examine the figures for Ancoats, Central, and St. George's, that the incidence of whooping cough mortality does shift from district to district.

Thus the mortality in Ancoats and Central reaches a minimum point in 1893, while for the same year it is at a maximum point in St. George's.

Again in 1895 the same relation recurs.

Cheetham, again, largely adjoins St. George's, but the maxima and minima bear no relation to each other. The discrepancy, however, is so great as to suggest that the mortalities are dominated by sanitary circumstances.

Between the adjoining districts of Bradford and Beswick there is a general correspondence in the waves of the disease, but the actual mortalities are widely different, suggesting again difference in sanitary circumstances.

In Ardwick, again, which adjoins Bradford, there is a fairly close correspondence with that district.

In Chorlton-upon-Medlock, which adjoins Ardwick, there is a general correspondence with that district.

In West Gorton there is a distinctly different wave.

Openshaw corresponds, not with West Gorton, which it adjoins, but with the group Bradford, Beswick, Ardwick, Chorlton-upon-Medlock.

These facts seem to show that whooping cough is more of an endemic disease than measles, more dependent for its spread on seasonal causes and general causes, and less on the presence of individual foci, such as undoubtedly infant departments do form.

SUMMER DIARRHŒA.

On the 10th July, 1898, the four-foot thermometer stood at 56°, the critical point at which Dr. Ballard has shown that summer diarrhœa assumes a prevalent character. The thermometer continued to rise until, on the 31st of August, it stood at 59°·7, and on the 13th of September it reached 59°·8. From this date a fall set in, and on September 30th it stood at 58°·4.

The following are the registered deaths from diarrhœa in weeks during the third quarter of the year :—

July 9th	3
„ 16th.....	9
„ 23rd.....	5
„ 30th.....	16
Aug. 6th	32
„ 13th.....	52
„ 20th.....	40
„ 27th.....	84
Sept. 3rd.....	107
„ 10th.....	103
„ 17th.....	105
„ 24th.....	120
Oct. 1st.....	106
	<hr/>
	782
	<hr/>

The numbers of deaths in quarters are as follows :—

DIARRHŒA DEATHS IN QUARTERS 1891-1898.

	1891	1892	1893	1894	1895	1896	1897	1898
First Quarter	45	32	48	47	51	37	49	54
Second Quarter	64	36	131	55	59	78	50	46
Third Quarter	217	275	688	212	574	379	773	782
Fourth Quarter	106	75	89	61	220	66	61	178
	432	428	956	375	904	560	933	1060

By means of the following table we are enabled to observe the comparative degree of severity with which different districts of the City have been visited. It should be compared with the corresponding tables in recent reports :—

1898.—DEATHS AND DEATH-RATES FROM DIARRHŒA IN THE VARIOUS DIVISIONS OF THE CITY.

STATISTICAL DIVISIONS		Estimated Population	Deaths	Death-rates
City of Manchester		541,296	1,060	1·96
I. Manchester Township		145,208	375	2·58
II. Northern Districts		144,879	235	1·62
III. Southern Districts		251,209	450	1·79
I.	Ancoats	45,488	121	2·66
	Central	35,845	95	2·65
	St. George's	63,875	159	2·49
II.	Cheetham	31,355	23	0·73
	Crumpsall	9,916	4	0·40
	Blackley	8,162	3	0·37
	Harpurhey	12,529	28	2·24
	Moston	6,833	16	2·34
	Newton Heath	37,527	58	1·55
	Bradford	23,337	71	3·04
	Beswick	10,976	18	1·64
	Clayton	4,244	14	3·30
III.	Ardwick	37,817	88	2·33
	Openshaw	31,961	72	2·25
	West Gorton	28,130	77	2·74
	Rusholme and Kirk:.....	19,830	27	1·36
	Chorlton-on-Medlock	61,851	56	0·91
	Hulme	71,620	130	1·82

By means of the following rates we are enabled to compare the fatality from diarrhoea in Manchester with that prevailing in other parts of the country :—

1898.—DIARRHOEA MORTALITY.—RATE PER 1,000 LIVING, COMPARED WITH MEAN OF FIVE YEARS.

	1893	1894	1895	1896	1897	Mean	1898
England and Wales	0·96	0·35	0·88	0·55	0·86	0·72	0·96
33 Great Towns	1·23	0·50	1·19	0·79	1·24	0·99	1·22
London	0·80	0·41	0·82	0·72	0·92	0·73	0·97
City of Manchester	1·75	0·70	1·66	1·04	1·74	1·38	1·96
Manchester Township	2·22	1·11	2·20	1·43	2·33	1·86	2·58
North Manchester	1·49	0·52	1·38	0·79	1·48	1·13	1·62
South Manchester	1·59	0·54	1·50	0·94	1·54	1·22	1·79
67 Smaller Towns	1·24	0·41	1·13	0·68	1·05	0·90	1·09
Rural Districts	0·72	0·24	0·64	0·36	0·56	0·50	0·75

The following table supplies meteorological data for the third quarter of the year, the season in which the disease is most prevalent :—

Third Quarter of the years	Mean Temperature	Rainfall, Inches	Humidity, per cent.	Diarrhoea Mortality. Annual Rate per 1,000 living
1887	59°·0	7·7	73 %	3·38
1888	56°·5	11·2	77 %	1·36
1889	57°·7	10·5	73 %	2·61
1890	58°·8	8·1	74 %	2·28
1891	58°·2	12·8	79 %	1·57
1892	57°·0	12·5	78 %	2·07
1893	60°·4	10·7	74 %	4·95
1894	57°·8	9·0	78 %	1·55
1895	60°·4	11·2	77 %	4·17
1896	58°·5	9·7	76 %	2·86
1897	58°·9	9·7	73 %	5·78
Mean	58°·5	10·3	76 %	2·96
1898	60°·1	6·1	74 %	5·79

The death-rate from diarrhoea in 1898 was 1·96 per 1,000, a mortality the equal of which we do not find later than the year 1872. And the most striking thing is that the mortality in 1897 was but little less heavy, and, with the exception of 1893, without an equal till we reach back to the year 1873. In 1871, 1872, and 1873, as now, there was a succession of heavy death-rates from this disease.

As has been formerly stated, the etiology of this disease is by no means clear.

What is quite certain is that children fed on the breast stand but a slight chance of contracting fatal summer diarrhoea as compared with children fed by hand. There is thus no doubt whatever that it is mainly by means of the food that fatal diarrhoea is contracted. It is, however, not only milk that is capable of conveying the disease. This has been quite sufficiently proved by our inquiries into infant feeding. Moreover, the great prevalence of diarrhoea amongst adults at the period of the year when it is so fatal to children quite sufficiently shows the same thing. Finally, many cases of diarrhoea have been traced directly to the consumption of tainted food other than milk.

Nevertheless, milk is the food by which the fatal diarrhoea of infants is most commonly conveyed to them, and requires special care and attention.

There can be practically no doubt that summer diarrhoea is a specific disease caused by a germ or germs present in the soil, which have already reached a great abundance when the four-foot thermometer records 56° with an ascending temperature. It is better to select this thermometer, not that the depth of 4 feet has probably anything to do with the matter, but because the readings are comparatively exempt from fluctuations of temperature to which the 1-foot thermometer is subject, and the statement is truer than any other brief one.

There is at present a tendency to regard summer diarrhoea as due to one specific germ, and a bacillus resembling the bacillus-coli is mentioned in connection with the disease. The uniformity of the phenomena attending the disease would seem to point in this direction.

The general phenomena must, of course, be in accord with the properties of any germ which may be affirmed to be the *vera causa* of diarrhoea. What, then, are these general phenomena? In the first place, the disease is not an infectious one. That is to say, its occurrence is not usually, indeed rarely, marked by simultaneous or successive attacks in the same family, although simultaneous attacks occur more frequently than successive attacks. Such has been the result of careful inquiry, and though the subject may require a more special investigation, the statement may broadly be taken as correct.

The attacks are very numerous compared with the deaths, and, considering the high mortality of the disease, the infective material must be very widely distributed. This is also shown by the course of the disease in different localities. It does not go up and down in different localities under the influence of special local causes, but in all the large centres of population the annual mortalities ascend and descend together.

Further, it is not a question of mere sanitary condition, using the word in its broadest sense, inasmuch as the mortality from diarrhoea does not necessarily correspond with the general death-rate. This is well seen in the case of Leicester, which has a low general death-rate but a high diarrhoea death-rate. The circumstances, then, determining the overflow of this disease are of a limited character, and should therefore be capable of fixation, though not without a careful study.

At the same time, the mortality throughout the country generally ascends and descends with the mortality in any one of the large towns. It would seem, therefore, that it should be capable of expression in very general terms. Accordingly it has been stated that the mortality from diarrhoea is greatest in hot and dry years. On reference to the table of meteorological data, it will be seen that this is in the main correct. It would be a still better generalisation, however, to say that all those years having a high mean temperature in the third quarter have a high diarrhoea death-rate. Neither of these expressions, however, covers the whole of the facts.

Thus in 1887 the mean atmospheric temperature in the third quarter was 59° the rainfall 7.7 inches, the humidity 73 per cent., and the diarrhoea death-rate was 3.38 per 1000.

In 1897 the mean temperature was $58^{\circ}9$, the rainfall 9.7 inches, and the humidity 73 per cent., while the diarrhoea death-rate was 5.78.

However, the death-rate follows temperature more closely than it does rainfall. Thus in 1895 the temperature was $60^{\circ}4$ and in spite of a high rainfall and humidity per cent. the diarrhoea death-rate was 4.17.

As we have seen under "Enteric fever," a fall of rain sufficient to fill the pores of the soil favours an increase of diarrhoea, provided it is preceded and followed by dry, warm weather. This, of course, by no means alters the general relation, but it suggests a modification in the interpretation of the factors.

In the elaborate investigation carried out by Dr. Ballard, he gave a number of facts which seemed to show the dependence of the disease in great part on a variety of insanitary conditions, such as filth, overcrowding, neglect. In regard of these we may gather something by a study of the behaviour of the disease in different districts of the City. It is necessary at the same time to

remember that we are dealing with death-rates and not with attack-rates. We have already seen that though the Manchester Township has a lower attack-rate from enteric fever than North and South Manchester, it has usually a higher death-rate. This we ascribed largely to the feebler resistance of persons in the Central portions of the City. But this is even truer of diarrhoea in infants than of enteric fever, and we must not infer from the high death-rate of infants in Ancoats, Central, and St. George's a correspondingly high attack-rate. With this preliminary, we may go on to consider the districts which show most persistently a high diarrhoea mortality.

Constructing a table similar to that made for enteric fever, we get

HIGH DIARRHOEAL DEATH-RATES.

1891, 1892, 1893 — Bradford, Ancoats, Central, St. George's, Clayton, West Gorton, Openshaw, Newton.

1894.—Ancoats, Central, St. George's, Bradford, Hulme, Clayton, Beswick, West Gorton.

1895.—Clayton, West Gorton, Ancoats, Bradford, St. George's, Central, Openshaw, Beswick.

1896.—Clayton, Ancoats, Central, Bradford, St. George's, Hulme, Openshaw, Beswick.

1897.—Ancoats, Bradford, Hulme, Clayton, Harpurhey, Beswick, St. George's, West Gorton.

1898.—Clayton, Bradford, Ancoats, Central, West Gorton, St. George's, Moston, Ardwick.

Thus the districts which show the steadiest persistence of a high fatality from diarrhoea are Bradford, Clayton, St. George's, Ancoats, Central, West Gorton, Openshaw, and Beswick.

With the exception of the three Central districts, the districts in which fatality from summer diarrhoea is specially persistent are very much the same as for enteric fever. It is possible, then, that the midden privy exercises very much the same disastrous influence in regard to this disease that it does in the case of enteric fever.

It is at the same time necessary to remember that other influences besides that of local filth conditions enter very largely into the causation of the high mortality from this disease.

Chief of these are :—

1. The extent to which milk is contaminated with specific organisms, and specially with the specific germ of diarrhoea, before it is brought under the influence of local conditions.

[That such contamination occurs largely has been shown by Professor Delépine.]

2. The physical condition of the infant will largely determine its fate under an attack of diarrhoea. This is an important factor, which tells strongly against the Central parts of the City.

3. The poorest class of people are much more liable than those who are better off to use and to give to their children tainted foods other than milk. This also tells against the Central districts.

4. The amount of care bestowed on the cleaning of the feeding bottle and teats is possibly an important factor.

We are doing all we can to instruct parents in the precautions necessary to be taken in the feeding of infants, but the greatest unreason prevails.

Any conclusions to which our results may point in regard to diarrhoea should of course be checked by a reference to the birth-rates, since, *cæteris paribus*, districts with the highest birth-rates will have the highest total death-rates from diarrhoea. (See Tables, pages 90 and 93.)

Treating the birth-rates as we have done the death-rates from diarrhoea, we find that the highest are :—

1891.—Beswick, Bradford, Ancoats, West Gorton, Harpurhey, Ardwick, St. George's, Hulme.

1892.—Beswick, Bradford, Ancoats, Openshaw, West Gorton, St. George's, Hulme, Newton.

1893.—Beswick, Ancoats, West Gorton, Ardwick, St. George's, Bradford, Hulme, Newton.

1894.—Bradford, Ancoats, West Gorton, Beswick, St. George's, Ardwick, Openshaw, Clayton.

1895.—West Gorton, Ancoats, St. George's, Bradford, Beswick, Ardwick, Hulme, Openshaw.

1896.—Ancoats, Bradford, Beswick, Ardwick, Clayton, West Gorton, Harpurhey, St. George's.

1897.—Bradford, Harpurhey, Ancoats, Beswick, St. George's, Ardwick, Clayton, Moston.

1898.—Clayton, Harpurhey, Ancoats, Moston, Ardwick, Bradford, Cheetham, Beswick.

The districts having the most persistently high birth-rates are Bradford, Ancoats, Beswick, St. George's, West Gorton, Harpurhey, Ardwick, Clayton, and Hulme.

These are much the same districts as those giving the highest persistent mortality from diarrhœa, so that while we must still insist on other grounds on the connection between a high diarrhœa fatality and bad conditions of excreta collection and removal, it must be granted that the evidence which we have already adduced is slightly weakened by a study of the birth-rates of the districts concerned, only slightly, however, since the difference in the diarrhœa death-rates is very much greater than the difference in the birth-rates.

In regard to one district—viz., the Central—there can be no hesitation in supposing that there is a special incidence of unfavourable conditions causing the high diarrhœal mortality, since in this district the birth-rate is persistently low.

A comparison of the closets found in connection with fatal diarrhœa in former years seemed to show that there was not so intimate a relation between defective closet conditions and diarrhœa as between that class of defect and typhoid fever or even scarlet fever. At the same time I was not disposed to insist too strongly on this deficiency of evidence, as it appeared possible to ascribe it to some extent to want of care in observation. The conclusion to which the details here given lead us is, I think, that privy midden districts do suffer in excess of other districts from diarrhœa, but that it is possible to over-estimate that influence, which requires to be controlled by the test of the birth-rate on one hand, and to be appraised by the influence of poverty on the fatality of cases on the other hand.

An examination of the relation between diarrhœa mortality and the character of the subsoil in each district does not give any positive indication, except to produce an impression that, other things being equal, a clay surface tends to be associated with a heavier death-rate from this disease than a sand or gravel subsoil.

ON TUBERCULOSIS.

The record of the past year is happily to some extent one of results achieved, and not merely of efforts to engage attention to this most important disease.

Acting on the recommendation of the last Royal Commission on Tuberculosis, your Medical Officer made a Report to the Sanitary Committee in September last, embodying an account of the results of examination of

cattle, and of samples of milk as carried out in Manchester, and suggesting that powers should be applied for in Parliament similar to those possessed by the Corporation of Glasgow under their Police Amendment Act 1890. Accordingly, the Sanitary Committee, on September 28th of last year, passed a resolution that the Town Clerk should be instructed to insert in the next Omnibus Bill promoted by the Corporation clauses similar to those mentioned, and containing such other provisions as might be necessary in reference to tuberculosis, and directing that a copy of this resolution and of the report of the Medical Officer of Health should be forwarded to the Local Government Board.

As a consequence of this resolution, clauses were accordingly framed by the Town Clerk and inserted in the Omnibus Bill of 1898. When, however, this bill came to be considered at the ratepayers' meeting, it was evident that strong opposition existed to the clauses, and in order to carry them it was found necessary to abandon the expressions which included advanced tuberculosis, and to restrict the powers to diseases of the udder.

The following statement gives an account of the leading facts which induced the Committee to apply for these powers, and the powers asked for as modified in consequence of the ratepayers' meeting :—

Public Health Office,

Town Hall, Manchester,

February 27th, 1899.

Statement in Reference to the Manchester Milk Clauses.

1. The Manchester Clauses are based on Clauses in the Glasgow Police Amendment Act 1890, which clearly established the principle that Urban Communities have a right to satisfy themselves that milk brought from outside into their district is not derived from cows diseased in such a manner as to convey an infective quality to the milk. This principle appeared a sound one to the members of the last Royal Commission on Tuberculosis.

2. There is a special reason why this protection should be sought in regard to tuberculosis. There is ample evidence that highly tuberculous milk, such as is obtained from tuberculous udders, readily conveys the disease to young animals fed with it, and there is no reason for supposing that young children are not equally susceptible. It is true that such milk will nearly always be diluted with sound milk, but this cannot be regarded as a sufficient protection.

3. The Manchester investigations were commenced in 1896. It was first shown, by an examination of 19 samples of milk taken from individual cows in Manchester cowsheds, that those obtained from cows highly tuberculous, but having no affection of the udder, did not contain the infection of tubercle, and that out of 10 obtained from indurated

udders only 5 contained tubercle bacilli in ascertainable amount. These results agree with the best scientific opinion at the present time that tubercle bacilli will only be found continuously in the milk when the udder is tuberculous. On the other hand, when the milk from a number of cows is shown to contain the infection of tubercle, the presumption is that one or more of the cows is affected with tuberculosis of the udder, which it should generally be possible to discover.

4. Accordingly, in 1897 and 1898, samples were obtained at Manchester Railway Stations of mixed milks coming from farms outside the district to the number of 108. Of these, 20 have proved to be tuberculous. The examinations have been conducted by Professor Delépine, who has bestowed the greatest care on this matter. Thus the percentage of samples taken which have been shown to be tuberculous is 18·5 per cent.—a sufficiently serious figure. When the examination of the first 93 samples was completed, Mr. James King visited 16 out of the 17 farms from which the tuberculous milk was derived, and on 14 out of the 16 he found one or more cows with indurated udders.

5. On the 16 farms visited there were 426 cows, giving an average of something over 26 cows per farm. The total number of cows with indurated udders was 26. If, now, the remaining 77 farms not visited, and from which with one exception the milk was sound, may be supposed to have had an average of 26 cows, the total number of cows subjected to bacteriological scrutiny would be $2002 + 426 = 2428$, and the proportion of cows with indurated udders would be 1 per cent.

6. The Manchester Clauses, if passed, will operate very much as do the Sale of Food and Drugs Acts, with additional protection to the farmer. Under those Acts, samples of milk are taken at the railway station, and if they are found adulterated, prosecution of the farmer consigning the milk ensues. On receipt, however, of the Public Analyst's Certificate that a sample of milk taken at a railway station, consigned from a farm outside the City, is adulterated, it has been customary in Manchester and neighbouring towns for an Inspector to visit the farm, see the cows milked, and take average samples of the milk for analysis, which samples are then analysed, and the results compared with those given by the presumably adulterated milk. This is clearly a protection to the honest farmer.

7. It is not proposed under the Manchester Clauses to proceed against the farmer whose milk is found to contain the infection of tubercle, although a very high presumption exists that he is sending milk obtained from one or more diseased udders, nor is it proposed to do anything more than to require him to remove from his herd cows suffering from a diseased udder. When, upon the examination of a consignment of milk

from him, it is found to contain the infection of tuberculosis, as shown by the highest expert authority, a competent veterinary surgeon will be instructed to go and examine his cows, and to select those from which the diseased milk is derived. When such cows are found, no action will be instituted against the farmer unless he fails to remove the affected cows or ceases to supply Manchester with diseased milk.

Every precaution will be taken to ensure an accurate result. When particular cows have been selected as suffering from tuberculosis of the udder, their actual condition will be determined in various ways, and especially by subjecting to bacteriological examination a sample drawn direct from the affected udder. Moreover, the farmer can protect himself against any supposed injustice by getting skilled advice.

8. It is claimed that towns have a right to know the conditions under which the milk consumed by them is produced, and that, therefore, the Veterinary Surgeon who examines the cows should not only be an official independent of practice, but should be a town official.

9. Several objections have been raised against the Bill. Those which deserve consideration seem to be—

1. A farmer should receive compensation. If the condemned cows can possibly be shown not to have had tuberculosis of the udder, he certainly should—not otherwise.
2. There may be overlapping. A farmer may be supplying different districts, and he may be assailed from several quarters. This can easily be avoided by ascertaining in every case whether he is supplying other districts, and take concerted action.
3. A measure to deal with this matter should be Imperial. So it should if the object to be aimed at is elimination of tuberculosis in cattle, but not for the safeguarding of milk.
4. That at least the veterinary examination should be conducted by the district concerned. If by the district is meant the administrative county which employs a special veterinary service, there is something in the plea; but the results to towns will not be so satisfactory.

10. It may further be pointed out that much may be effected by skilled veterinary examination of herds on the part of authorities, as shown by the results of Mr. King's examination of cows in this City, published in the report on Manchester Cowsheds. (*See accompanying Extract.*) No such action, however, appears to have been taken by County or other Rural Authorities.

MEDICAL OFFICER OF HEALTH.

EXTRACT FROM REPORT ON MANCHESTER COWSHEDS.

APPENDIX D.

MILCH COWS CONDEMNED IN MANCHESTER COWSHEDS AS BEING AFFECTED WITH TUBERCULOSIS AND TOO DISEASED TO YIELD MILK FIT FOR HUMAN CONSUMPTION.

No.	Owner of Farm	Cow condemned as Milch Cow by Veterinary Inspector Date	State of Cowshed	Cow Slaughtered	Conditions found in Carcase	Date of Isolation	Remarks
1	A	February 20th, 1896	Small sheds; light and ventilation bad	February 20th, 1896	Generalised tubereulosis .....	.....	Slaughtered at Rusholme Abattoir. Carcase eondemned.
2	„	March 18th, 1896...	Ditto ditto	April 1st, 1896	Ditto .....	.....	Ditto ditto
3	B	May 1st, 1896	Small unregistered place, totally unfit.....	May 3rd, 1896	Disease confined to lungs and udder ...	.....	Reacted to tuberculin test. Parts of earcase condemned.
4	„	May 15th, 1896.....	Ditto ditto	May 16th, 1896 ...	Ditto ditto .....	.....	Ditto ditto
5	C	June 11th, 1896 ...	Drainage and ventilation bad	June 15th, 1896 ...	Generalised tuberculosis .....	.....	Removed on Inspector's advice to knackery, and slaughtered.
6	D	June 11th, 1896 ...	Fair and well kept	June 17th, 1896 ...	Ditto .....	.....	Ditto ditto
7	E	June 29th, 1896 ...	Small place, but clean	July 2nd, 1896	Ditto .....	.....	Ditto ditto
8	F	June 30th, 1896 ...	Good shed	July 15th, 1896 ...	Ditto .....	.....	Ditto ditto
9	G	July 18th, 1896 ...	Short of air space	July 19th, 1896 ...	Ditto .....	.....	Slaughtered at Rusholme Abattoir. Carcase eondemned.
10	H	September 7th, 1896	Fair and well kept	September 19th, 1896	Ditto .....	.....	Removed on Inspector's advice to knackery, and slaughtered.
11	I	October 7th, 1896...	Well kept, badly ventilated	October 8th, 1896...	Ditto .....	.....	Slaughtered at Rusholme Abattoir. Carcase condemned.
12	J	October 9th, 1896...	As in No. 8	October 12th, 1896	Ditto .....	.....	Removed on Inspector's advice to knackery, and slaughtered.
13	K	October 8th, 1896...	Good shed, clean	October 12th, 1896	Lungs and udder extensively diseased...	.....	Ditto ditto
14	L	.....	Floor and drainage bad, place dirty.....	October 28th.....	Generalised tuberculosis .....	.....	Slaughtered on premises. Attempted to sell. Prosecuted. Fined £5 and costs.
15	„	November 2nd, 1896	Ditto ditto	November 3rd, 1896	Ditto .....	.....	Removed on Inspector's advice to knackery, and slaughtered.
16	M	October 8th, 1896...	Low shed, light and ventilation bad	November 1896	Ditto .....	.....	Ditto ditto
17	N	December 21st, 1896	As in No. 11	December 22nd, 1896	Lungs and pleura diseased .....	.....	Slaughtered in private slaughter house. Parts of carcase eondemned.
18	O	January 25th, 1897	Poor sheds.....	February 2nd, 1897	Localised in lungs and udder .....	.....	Killed at Water Street Abattoir. Diseased parts eondemned.
19	P	February 10th, 1897	Fairly good, well kept	February 17th, 1897	Disease confined to viscera .....	.....	All reacted to tuberculin test, February 11th, 1897. Slaughtered at the Abattoirs, Water Street, where the carcasses were examined and the diseased parts condemned.
20	„	Ditto	Ditto	March 2nd, 1897 ...	Ditto .....	.....
21	„	Ditto	Ditto	Ditto	Ditto lungs .....	.....
22	„	Ditto	Ditto	February 17th, 1897	Ditto ditto .....	.....
23	„	Ditto	Ditto	February 23rd, 1897	Thoracic and abdom. viscera .....	.....
24	„	Ditto	Ditto	March 3rd, 1897 ...	Generalised tuberculosis .....	.....
25	„	Ditto	Ditto	March 30th, 1897...	Localised udder and mesenteric glands...	.....	Not tested with tuberculin. Carcase condemned.
26	„	Ditto	Ditto	Ditto ...	Ditto lungs ditto ...	.....	Reacted to tuberculin test. Killed at Abattoir. Diseased parts eondemned.
27	„	Ditto	Ditto	Ditto ...	Ditto ditto ditto ...	.....	Not tested. Ditto ditto
28	Q	February 15th, 1897	Small, bad light and ventilation	February 22nd, 1897	Disease localised in lungs and udder ...	.....	Reacted to tuberculin test. Ditto ditto
29	„	Ditto	Ditto	Ditto	Ditto ditto ...	.....	Reacted to tuberculin test. Slaughtered at Abattoirs. Careases passed.
30	R	February 15th, 1897	Bad light and ventilation .....	.....	.....	Isolated	Ditto ditto
31	S	February 15th, 1897	Light and ventilation bad, floor uneven, &c...	.....	.....	To be isolated ...	Reacted to tuberculin test.
32	„	March 15th, 1897...	Ditto ditto ...	.....	.....	Ditto ...	Under observation. Did not react to tuberculin test.
33	„	Ditto	Ditto ditto ...	.....	.....	Ditto ...	Reacted to tuberculin test.
34	„	Ditto	Ditto ditto ...	.....	.....	Ditto ...	Ditto ditto
35	T	March 16th, 1897...	Good shed .....	.....	.....	Isolated	Ditto
36	U	March 18th, 1897...	Fair shed .....	.....	.....	To be isolated .	Advised to remove from shed.

JAMES KING, M.R.C.V.S.,

Chief Inspector.

Manchester Milk Clauses.

20.—(1) Every person who knowingly sells or suffers to be sold or used for human consumption within the city the milk of any cow which is suffering from a diseased or indurated udder shall be liable to a penalty not exceeding ten pounds for each offence.

(2) For the purpose of giving effect to this section the medical officer or any inspector of nuisances exhibiting the authority in writing of such medical officer may at any time or at any place within the city take samples of milk for the purpose of bacteriological examination and may submit the same for such examination. A duplicate of the sample shall be forthwith delivered to the person (if any) in charge of the milk.

(3) The medical officer or any veterinary surgeon exhibiting the special authority in writing of such medical officer may from time to time within reasonable hours enter any byre or cowshed within the city or wherever situated if the milk produced therein is being sent for sale within the city and may inspect and examine the cows kept therein for the supply of milk in order to determine whether any cow suffers from diseased or indurated udder and every person in charge of such byre cowshed or place shall render such reasonable assistance to the medical officer or such veterinary surgeon exhibiting the authority in writing of the medical officer for the purpose of inspection and examination as may be required by them and any person refusing such assistance or obstructing the inspection shall be liable to a penalty not exceeding five pounds.

(4) Every dairyman or keeper of a byre or cowshed whose milk is sold within the city who after intimation has been made to him by the medical officer that any cow in his possession kept for the supply of milk suffers from temporary disease of the udder shall send the milk from such cow for sale within the city before such intimation is withdrawn by the medical officer shall be liable to a penalty not exceeding five pounds.

(5) Every dairyman or keeper of a byre or cowshed whose milk is sold within the city who after intimation has been made to him by the medical officer that any cow in his possession kept for the supply of milk for human consumption suffers from a chronically diseased or indurated udder shall retain such cow in his possession shall be liable to a penalty not exceeding five pounds and a daily penalty not exceeding forty shillings.

(6) This section may be carried into effect by the Corporation as the sanitary authority of the city who are hereby authorized to appoint inspectors for such purpose.

It will be seen that these clauses propose to deal not merely with tuberculous milk, but also with milk derived from other conditions of the udder. They contemplate that the veterinary surgeon named in the clauses shall go to the farm, if so directed, and examine the cows for the presence of diseased udders.

A number of other towns also pursued the same course as Manchester, including Leeds, Salford, Stockport, Blackpool, Bootle, and Darwen, and the clauses which they sent up, not being opposed, were more drastic than those submitted by the Manchester Corporation.

There was, moreover, considerable variation, and it was suggested by the Local Government Board that Parliament would be more likely to pass the separate local proposals if the various Corporations could agree to one set of clauses common to all, to be inserted in their bills.

The lines on which it was considered that such clauses might be usefully drafted were also suggested by the Board, who have taken the greatest trouble to assist the Authorities in this matter. Mr. Fitzgerald was asked to draft the clauses in question. When drafted they were carefully revised by representatives of the various Corporations and by Mr. Boyce, along with gentlemen representing the Corporations. They were also discussed at a meeting with the Parliamentary Committee of the Associated Chamber of Agriculture, and as a result the disease to be dealt with was restricted to tuberculosis as it affects the udder.

On these negotiations the Chairman of the Sanitary Committee bestowed a great amount of pains.

The following are the clauses which have now become law :—

19—(1) In this section—

“Dairy” shall include any farm farmhouse cowshed milk store milk shop or other place from which milk is supplied or in which milk is kept for purposes of sale ;

“Dairyman” shall include any cowkeeper purveyor of milk or occupier of a dairy ;

“Medical officer” shall include any person duly authorised to act temporarily as medical officer of health.

(2) Every person who knowingly sells or suffers to be sold or used for human consumption within the city the milk of any cow which is suffering from tuberculosis of the udder shall be liable to a penalty not exceeding ten pounds.

(3) Any person the milk of the cows in whose dairy is sold or suffered to be sold or used for human consumption within the city who after becoming aware that any cow in his dairy is suffering from tuberculosis of the udder keeps or permits to be kept such cow in any field shed or other premises along with other cows in milk shall be liable to a penalty not exceeding five pounds.

(4) Every dairyman who supplies milk within the city and has in his dairy any cow affected with or suspected of or exhibiting signs of tuberculosis of the udder shall forthwith give written notice of the fact to the medical officer stating his name and address and the situation of the dairy or premises where the cow is.

Any dairyman failing to give such notice as required by this sub-section shall be liable to a penalty not exceeding forty shillings.

(5)—(A) It shall be lawful for the medical officer or any person provided with and if required exhibiting the authority in writing of such medical officer to take within the city for examination samples of milk produced or sold or intended for sale within the city.

(B) The like powers in all respects may be exercised outside the city by the medical officer or such authorised person if he shall first have obtained from a justice having jurisdiction in the place where the sample is to be taken an order authorising the taking of samples of the milk which order any such justice is hereby empowered to make.

(6)—(A) If milk from a dairy situate within the city is being sold or suffered to be sold or used within the city the medical officer or any person provided with and if required exhibiting the authority in writing of the medical officer may if accompanied by a properly qualified veterinary surgeon at all reasonable hours enter the dairy and inspect the cows kept therein and if the medical officer or such person has reason to suspect that any cow in the dairy is suffering from tuberculosis of the udder he may require the cow to be milked in his presence and may take samples of the milk and the milk from any particular teat shall if he so requires be kept separate and separate samples thereof be furnished.

(B) If the medical officer is of opinion that tuberculosis is caused or is likely to be caused to persons residing in the city from consumption of the milk supplied from a dairy situate within the city or from any cow kept therein he shall report thereon to the Corporation and his report shall be accompanied by any report furnished to him by the veterinary surgeon and the Corporation may thereupon serve on the dairyman notice to appear before them within such time not less than twenty-four hours as may be specified in the notice to show cause why an order

should not be made requiring him not to supply any milk from such dairy within the city until the order has been withdrawn by the Corporation.

(c) If the medical officer has reason to believe that milk from any dairy situate outside the city from which milk is being sold or suffered to be sold or used within the city is likely to cause tuberculosis in persons residing within the city the powers conferred by this sub-section may in all respects be exercised in the case of such dairy provided that the medical officer or other authorised person shall first have obtained from a justice having jurisdiction in the place where the dairy is situate an order authorising such entry and inspection which order any such justice is hereby empowered to make.

(D) Every dairyman and the persons in his employment shall render such reasonable assistance to the medical officer or such authorised person or veterinary surgeon as aforesaid as may be required by such medical officer person or veterinary surgeon for all or any of the purposes of this sub-section and any person refusing such assistance or obstructing such medical officer person or veterinary surgeon in carrying out the purposes of this sub-section shall be liable to a penalty not exceeding five pounds.

(E) If in their opinion the dairyman fails to show cause why such an order may not be made as aforesaid the Corporation may make the said order and shall forthwith serve notice of the facts on the county council of any administrative county in which the dairy is situate and on the Local Government Board and if the dairy is situate outside the city on the council of the borough or county district in which it is situate.

(F) The said order shall be forthwith withdrawn on the Corporation or their medical officer being satisfied that the milk supply has been changed or that it is not likely to cause tuberculosis to persons residing in the city.

(G) If any person after any such order has been made supplies any milk within the city in contravention of the order or sells it for consumption therein he shall be liable to a penalty not exceeding five pounds and if the offence continues to a further penalty not exceeding forty shillings for every day during which the offence continues.

(H) A dairyman shall not be liable to an action for breach of contract if the breach be due to an order under this sub-section.

(7) The Corporation shall cause to be given public notice of the effect of the provisions of this section by advertisement in local newspapers and by handbills and otherwise in such manner as they think sufficient and this section shall come into operation at such time not being less than one month after the first publication of such an advertisement as aforesaid as the Corporation may fix.

(8) Offences under this section may be prosecuted and penalties may be recovered by the Corporation before a petty sessional court having jurisdiction in the place where the dairy is situate or the offence is committed and not otherwise.

(9) All expenses incurred by the Corporation in carrying into execution the provisions of this section shall be chargeable upon the City fund and City rate and the Corporation may also charge upon the same rate any expenses incurred by them in the application by a veterinary surgeon of the tuberculin or other reasonable test for the purpose of discovering tuberculosis to any cow whose milk is or was recently being supplied within the city. Provided that no such test shall be applied except with the previous consent of the owner of such cow.

(10) This section may be carried into execution by a Committee of the Council formed in accordance with and subject to the provisions of the Fourth Schedule to the Diseases of Animals Act 1894 except that the Committee shall consist wholly of members of the Council.

There are some new features in these clauses which do not appear in the clauses as first proposed for Manchester.

Only tuberculosis of the udder is dealt with.

The cowkeeper must notify to the Medical Officer of Health the presence of any cows in his dairy exhibiting signs of tuberculosis of the udder under a small penalty.

Large powers are conferred on the Corporation by way of stopping the supply of milk from a dairy, the milk from which is likely to cause tuberculosis.

Only experience can show how these clauses will work in actual practice.

These powers, if efficiently used, and found workable, are likely to produce an important effect not merely in the improvement of the milk supply, but in the quality of the dairy stock in adjoining counties. Important as they seem, however, they leave the main problem of tuberculosis untouched, which is to seek out the various modes in which tuberculosis is conveyed from one person to another, and to prevent its transmission. Accordingly, this question was raised in the end of last year in connection with the establishment of a National Association for the Prevention of Phthisis, and in accord with the wish of the Sanitary Committee the Medical Officer of Health prepared the following Statement as to the mode in which the question of prevention might be approached.

Report on the Prevention of Tuberculosis.

INTRODUCTORY.

June 20th, 1899.

In again laying before the Sanitary Committee his report on the course of administrative action which he considers to be necessary in an effective effort to diminish by direct action the terrible scourge of tuberculosis, your Medical Officer has not seen his way to modify his previous statement in any fundamental manner.

He would respectfully point out that phthisis is an infectious disease; that we know more about this than about any other infectious disease; that about one-seventh of all deaths are due to tuberculosis; and that the illness and mortality fall chiefly on the middle periods of life, with serious consequences to the social condition of the population.

In phthisis, it is the well-marked cases that are most infectious: the infecting element is known to reside in the sputum, and the means whereby infection may be averted can be clearly deduced.

It will be seen from the body of the report that much stress has been laid on cleansing and disinfecting rooms which have been occupied by consumptives.

The procedure so far has been chiefly carried out by the householder, and a large number of rooms have been cleansed after the death of consumptive inmates. The method employed, in the case of rooms provided with a tolerably good paper, has been to clean the paper down with crumb of bread. Where, however, the rooms have been dirty, the ordinary processes of disinfection have been carried out. The procedure adopted has been mostly the former.

As a matter of fact, the large number of disinfections carried out in rooms occupied by consumptives has not aroused any opposition.

The object of the present statement is to indicate clearly the scope of the work which should ultimately be done by the Sanitary Authority in connection with phthisis. In carrying the plan sketched out into effect, it will be found advisable to proceed tentatively, carefully watching the result of each procedure.

As a beginning, it has appeared to your Medical Officer of Health that it would be necessary to approach the Public Institutions so as to secure the registration of cases attending them, and to appoint a Medical Assistant, who would deal primarily with the case of poor patients attending Public Institu-

tions. His chief functions would be to investigate the conditions threatening the households in which they reside, to collect facts, and to advise in reference to the precautions to be carried out.

Much of the work done in connection with the movement for reducing the mortality from consumption by methods directly founded on a knowledge of the habits of the disease has originated in Manchester and its environs, and it is hoped that the Council will see their way to give a public practical effect to these efforts.

STATEMENT.

In pursuance of an instruction from the Sanitary Committee, the Medical Officer of Health begs to report on the action which may be taken to arrest the propagation of tuberculosis.

The deputation from the Manchester and Salford Sanitary Association which waited on the Sanitary Committee on December 28th, 1898, was one of great weight, and the opinions expressed by the eminent medical men who chiefly composed it are entitled to very great consideration.

Dr. D. J. Leech, the Chairman of the Association, and other medical members, addressed the Committee on the desirability of additional efforts being made to reduce the death-rate from tuberculosis.

They dwelt upon the value of popular instruction, and urged the advisability of providing Sanatoria for cases of consumption, with a special view to open-air treatment. The chief spokesman for the Association (Dr. D. J. Leech) intimated at the same time that notification of these cases was desirable, and a member of the Sanitary Committee very pertinently inquired whether machinery was provided for the inclusion of tuberculosis amongst notifiable diseases. This was the more necessary to be asked, as Dr. Leech and the other medical men who spoke made it clear that consumption is an infectious disease, communicated from person to person and from cattle to man by the ingestion of tuberculous milk and meat.

Such being now the universally received view among well-educated people, it is necessary to inquire whether, and why, a different mode of procedure should be adopted in the case of consumption from that which has been pursued in the case of other infectious diseases, and what is the magnitude of the operations to which the Sanitary Committee will be committed if they take part in this movement. Similar action has been recently taken in London, where a Society, designated the National Association for the Prevention of Consumption and other forms of Tuberculosis, has recently been formed. On December 20th a meeting was held at Marlborough House, at which a number

of persons were present by invitation of His Royal Highness the Prince of Wales, including the Prime Minister and Lord Rosebery. Speaking on behalf of the National Association, Sir William Broadbent stated that its objects were—

1 To educate the public as to the means of preventing the spread of consumption from those already suffering from the disease.

2. To extinguish tuberculosis in cattle.

3. To promote the erection of Sanatoria for the open-air treatment of tuberculous disease. Much emphasis was laid on the necessity of avoiding all compulsory measures, and this aspect of the movement was welcomed by the Prime Minister, who spoke of any attempt to introduce the power of the law as a snare that they should carefully avoid.

The consideration of these questions involves some preliminary reflection on the ways in which the disease is communicated. Indeed, a very full knowledge is required if we are to grapple successfully with the problems of administration, and no scheme can be worked without administration.

Like some other diseases, such as typhoid fever and diphtheria, tuberculosis is caused by the presence in the body of a minute organism, which, when properly stained and examined with a powerful microscope, looks like a rather thick needle with bright, round dots in it. If a row is formed of these little needles, placed in line so as to make a length of 1 inch, there will be some 8,500 in the inch, and if placed side by side so as to make a row 1 inch long there will be some 85,000 of them. Thus a square inch carpeted completely with them would contain 722,500,000, and if a cubic inch were made up of them the number would be unthinkable.

It will thus be easily understood that in a lung badly affected with phthisis the number of these little parasites is enormous.

Now so long as they are imprisoned in the body they are innocuous, and the phthisical person is not infective to his fellows. This is the case in the earlier stages of the disease, and also during the course of the illness from time to time. Very frequently, however, the matter coughed up by a consumptive person, especially when the disease is well established, is thickly charged with bacilli.

It is desirable, however, that it should be clearly stated that only when tuberculous matter is being discharged from the lung is a consumptive person infective to others.

Tuberculosis takes various forms, at all events for a time. Thus it may occur as tuberculosis of the lining membrane of the bowel, and in that case the bowel discharges will contain the infective matter of the disease.

But not infrequently the glands connected with the bowel are much diseased, a condition attended with wasting, while the lining membrane of the bowel is quite uninjured, having never been attacked, or having healed. In such a case the disease is called consumption of the bowels, but there is no escape of infective matter from the body, and the consumptive individual is not infective to others.

In the same manner the majority of cases of consumption of the brain are probably non-infective, because there is no outlet for the infectious matter.

In fact, cases of generalised acute tuberculosis rapidly ending in death are usually non-infective, or but slightly so.

Other forms of the disease which are non-infectious are closed tuberculous disease of the joints, and tuberculosis of the glands of the neck before they have broken down, as well as tuberculous diseases of the bones before these have begun to discharge matter.

On the other hand, all discharging forms of the disease, such as discharging tuberculous bones, running scrofulous glands, tuberculous ulcers of the mouth, and discharging tuberculous diseases of the nose, ear, and throat, are more or less infective. In most of these discharges the numbers of bacilli present are small compared with those found in sputum coughed up from a consumptive lung, and from the point of view of infection these forms of disease are therefore, less dangerous than cases of phthisis. They are not, however to be altogether neglected. The most dangerous discharge after sputum is that from a tuberculous bowel, then, perhaps, from a tuberculous nose or mouth.

The disease may be communicated by the inhalation of tuberculous matter—this is the usual way in which the lungs are attacked—or it may be communicated by swallowing tuberculous matters, or it may be inoculated on the mouth, or nose, or skin, if these should happen to receive tuberculous matter on a wounded surface.

Thus cases are on record where a wound from a knife used in cutting tuberculous carcasses has been the starting point of the disease.

Disease by inoculation is, however, so rare that it may be neglected.

Disease by swallowing tuberculous material is probably of more frequent occurrence than is usually believed. The reasons for this belief, however, need not be given in this report. It is probable that the majority of persons who are infected by way of the bowel receive their infection from tuberculous milk while the great bulk of the remainder are infected by accidental contamination,

in infected households. The most likely source of infection in this way in the case of children would be soiled floors leading to the fouling of children's hands which are then put in their mouths.

Undoubtedly, however, the great bulk of infections in man occur by the breathing in of tuberculous material. It will at once be seen that the material inhaled must be in a very fine state of division. Hence, the discharges from tuberculous persons cannot be the means of infection in the condition in which they leave the body.

Nothing is more certain than that they must be dried, and afterwards broken up and dispersed as fine dust, before they can reach the lungs by way of the respiratory passages.

A second condition, then, of the conveyance of infection from a consumptive person is that the discharges must get dried and ground into fine dust. But how do we know that the germs of tuberculosis will stand this rough treatment? That was conclusively shown by two German observers named Schill and Fischer, who proved that dried tuberculous sputum remains infective for many months, provided it is not exposed to direct sunlight.

Then, again, the germs once discharged might grow outside the body. There are very strong reasons, however, for believing that this does not take place, at all events to any material extent, in this climate.

The problem of preventing consumption spreading from man to man would thus be solved if we could in all cases ensure that the discharges from a consumptive person were not allowed to get dry, or were thoroughly disinfected.

A third and highly important condition of the transference of infection is that the part of the body in which the germs of consumption begin to grow must have been in some way weakened or injured.

The air passages, for example, may be injured or enfeebled by catarrhs arising from dusty occupations, from alcoholic indulgence, from close and unwholesome dwellings, by ordinary catarrhs, inflammation of the lungs, attacks of typhoid fever, attacks of measles and so forth, by privation, by weakness of constitution, or even as a sequel of mental distress.

A fourth condition is that the infection must be of some degree of intensity, that is to say, a number of germs must simultaneously assail the organism before the disease can effect a lodgment.

How, then, do we stand as to the chances of being assailed by a multitude of tubercle germs? Cornet, a Berlin physician, addressed himself to answer this question. By certain methods he was able to tell when a sample of dust collected from various places did not contain a sufficient number of germs to cause disease in man. He was able, as the result of prolonged investigation, to say that these germs were not present in such an amount in the dust of streets,

even in places frequented by consumptives, as to produce the disease in man ; nor were they present in consumption wards, or private rooms occupied by consumptives, if these were kept strictly clean, and if the tuberculous discharges were removed.

The field of preventive work is therefore limited to all those confined situations in which insufficient precautions are taken to prevent the discharges of tuberculous persons from getting dried and dispersed as dust.

This is a very valuable result to have attained, since it enables us at once to say that it is not necessary to interfere with the work or pursuits of a consumptive person further than to require him to take certain elementary precautions to protect his fellow workers. It also enables us to concentrate our attention on the interior of dwellings, on places of assembly, and on workshops, or on the articles produced in them.

It has been mentioned that an injury to the air passages or lungs, which may have resulted from illness, alcoholism, distress, or feeble physique, is a necessary preliminary to the reception of infection. None of these, however, will lead to tuberculosis if infection be withheld. This is well illustrated by the immunity which the Icelanders enjoy from this disease.

It is also illustrated by such a fact as this. There is a large school in this City in which the children are very closely packed in the dormitories, which, however, are kept in a state of admirable cleanliness. Many of these children are far from robust. If any one shows the slightest sign of tuberculosis he is immediately removed. They must frequently suffer from illness in one form or another, yet tuberculosis is very rare amongst them. The sources of infection are not allowed to remain.

Another illustration of the same fact is the great rarity of phthisis amongst nurses in well-managed general hospitals, and even in well-managed and well-appointed hospitals for consumption.

Many of the smaller herds in Zeeland were found by Bang entirely free from tuberculosis, although there is no reason for believing that they were well-housed. The disease had never been introduced amongst them.

It is well known that tuberculosis is most rife in the dirtiest parts of our great towns ; those parts, in fact, in which the infective material of the disease has been allowed to accumulate.

We have already seen that Cornet's investigations pointed in the same direction. Overcrowding, then, which has been held to be one of the chief factors in the spread of phthisis, fails of its effect where strict cleanliness is

observed and proper precautions are taken. Where, however, strict cleanliness is not observed, and proper precautions are not taken, overcrowding has a very powerful influence.

It is of the utmost consequence to realise these facts in endeavouring to arrest the propagation of the disease from one person to another. Enlightened and rigorous cleanliness is the most valuable, and is an essential condition of successful preventive effort.

On the other hand, crowding of individuals together in confined places becomes a matter of great importance where such conditions of cleanliness are not observed. This is very well illustrated by the history of our army, of prisons, and of common lodging-houses, as well as of many other institutions.

Villemin observed that while the finest troops quartered in insanitary barracks in Paris suffered terribly from phthisis, though under no strain and well fed, the disease was comparatively rare amongst troops engaged in campaigning, although the latter underwent the severest hardships and had much poorer fare.

The mortality amongst our own finest troops under similar conditions was also very remarkable, as is shown in the following table for 1853, extracted from the Report of the Royal Commission on the Organisation of Military Hospitals, issued in 1858.

Table showing for the year 1853 the death-rate from various causes, including phthisis, in different classes of troops quartered in barracks at home, compared with the death-rate of the civil population of 24 large towns at corresponding ages:—

TABLE A.

Rates of Deaths per 1000 of Mean Strength by	Household Cavalry	Dragoon Guards and Dragoons	Foot Guards	Infantry of the Line	Civil Population of 24 large towns
Inflammation of the Lungs, Pleurisy, and Acute Catarrh	0·2	0·7	1·3	1·3	0·5
Spitting of Blood, Consumption, Chronic Catarrh, Asthma, and difficulty of breathing	6·4	6·6	12·5	8·9	5·8
All causes	11·1	13·6	20·4	17·9	11·9

Even more striking figures are given by Cornet for the Prussian Catholic Nursing Institutions during the 25 years preceding 1888. The deaths ascribed to tuberculosis amongst the nurses, persons specially selected for strength of physique, amounted to 62·88 per cent. of all deaths.

At the ages 25–30 the average annual death-rate ascribed to tuberculosis alone reached the remarkable figure of 17·6 per 1,000.

Here, then, we have examples of people crowded together under insanitary conditions undergoing immense fatality from this disease; and a most striking fact is this, that these were not the victims of hereditary tendency, but persons of exceptionally vigorous constitution.

We thus learn that, given the presence of the infective matter of the disease in sufficient amount, and given also the absence of an educated cleanliness, all the other circumstances favouring the extension of the disease may be absent, and yet it may spread in a remarkable degree. These facts are the more striking inasmuch as, generally speaking, phthisis is not an easy disease to produce. A vigorous and prolonged resistance on the part of the body assailed takes place, for the most part, before the disease can establish itself. Your Medical Officer of Health found, as the result of direct inquiry into the history of persons dead of phthisis, that healthy people do not, as a rule, contract phthisis except after prolonged and intimate exposure to infection.

It has already been seen that the infective matter of tuberculosis takes effect only when it has been dried and reduced to dust. Clearly this is most liable to happen when the matters coughed up by consumptive persons are discharged on the floor of confined places, and are there dried and trodden into dust which can get into the atmosphere.

It has also been mentioned that specimens of dust taken from private rooms and public institutions occupied by consumptives in which educated cleanliness had not been observed, taken, moreover, from parts not readily accessible where it had been gradually deposited, when inoculated in guinea pigs, caused these animals to become consumptive.

It thus appears that when consumption is conveyed from one person to another, this is usually effected by means of the dust in the rooms occupied by both, and that the rooms themselves may be regarded as the medium of infection. That is to say, the link of transmission may be broken not merely by preventing discharges from getting into a room, but also by keeping the rooms in a state of strict cleanliness, especially the floors.

Amongst the places in which accumulation of infection and transmission of the disease do occur to a terrible extent are lodging-houses—especially common lodging-houses—and the crowded dwellings of the poorest class of people. Here we can demonstrate the relation of cause and effect. But doubtless the

same thing occurs in theatres, music-halls, public-houses, railway carriages, and many other crowded places of assembly in which spitting is freely indulged in. Your Medical Officer of Health is disposed to think that public-houses are liable to be especially dangerous in this respect. Certain it is that publicans and their servants stand about the top of the list of occupations which suffer most from phthisis.

It thus becomes evident that we have to do with the enforcement of enlightened cleanliness, including the carrying out of necessary measures of disinfection, especially in crowded and dirty houses.

From what we have already seen, pocket handkerchiefs used for the reception of matter coughed up, rapidly dried as they are in contact with warm clothing, serve not only to infect personal clothing, but must scatter a cloud of infective dust every time they are taken out and shaken preparatory to use. It is a matter deserving the careful consideration of the Sanitary Authority whether they would in all well-authenticated cases of consumption supply Dettweiler's pocket spittoon, or other equivalent article, on application, especially to indoor workers, with instructions how to use it.

These preliminary considerations may serve to convey some idea of the work to be done in practically dealing with the question. In considering administrative measures more fully we shall have to return to the details.

Before doing so, it is advisable to see what we can gather from a consideration of statistics, or from local records.

The following figures show the history of phthisis mortality recorded in England and Wales during the 45 years 1851-1895. They are taken from the statistics prepared by Dr. Tatham for the last Royal Commission on Tuberculosis.

TABLE B.—MORTALITY FROM PHTHISIS, IN SEVERAL PERIODS 1851-95, PER MILLION LIVING AT ALL AGES, AND AT GROUPS OF AGES.

Period		All Ages	Under 5 Years	5-	10-	15-	20-
Persons..	1851-60	2679	1305	572	1025	2961	4181
	1861-70	2475	968	454	825	2651	3928
	1871-80	2116	767	358	664	2036	3117
	1881-85	1830	569	312	560	1695	2535
	1886-90	1635	502	271	488	1420	2144
	1891-95	1463	444	228	410	1253	1875

TABLE B—continued.

Period		25—	35—	45—	55—	65—	75—
Persons . .	1851-60	4317	4091	3466	2840	1983	808
	1861-70	4243	4026	3340	2656	1603	539
	1871-80	3619	3745	3132	2449	1476	492
	1881-85	3154	3312	2849	2197	1362	490
	1886-90	2691	2985	2656	2150	1363	555
	1891-95	2342	2771	2440	1941	1147	440

They appear to show an enormous reduction in the fatality from phthisis since 1851, and one which is still in progress. A considerable deduction must be made on the ground of improved diagnosis. But, making every allowance, there can be little doubt that a diminution has taken place in the death-rate from phthisis. This has been variously ascribed to improved drainage, to improved dwellings, to a betterment in the circumstances of the classes most liable to suffer, and to a combination of all these conditions. Doubtless the last ascription is correct, and it is a very great encouragement to those who are engaged in devising schemes for the housing of the poorer classes, or for the diminution of crowding in the heart of our great towns.

When we study the figures for males and females, which are given separately, we find that females have benefited much more considerably than males, the recorded death-rate from females being now well under one-half of what it was in 1851-60.

At the same time, the recorded death-rates for young people have also improved in a remarkable degree, the recorded death-rate from phthisis under 5 years of age being now one-third of what it was in 1851-60, and the recorded death-rates up to the age of 25 being considerably less than one-half of what they were in those years.

The brunt of the mortality still falls, however, on adults, being greatest from the ages of 25 to 55, when the value of life is at its highest, both in

a social and economical sense. Indeed, the dislocation of family life caused by death from phthisis is far greater than from any other form of disease.

The same diminution has not occurred in the uncertain class of deaths tabulated as *tabes mesenterica*, tubercular meningitis, and *scrofula*, and it will be better in this connection not to consider them, particularly as they are more doubtful than deaths classified as phthisis.

Let us now see what has happened in Manchester in regard to phthisis. The death-rate per 1,000 has been gradually falling in this City since 1881, as is shown by the following figures, although at present there is a slight tendency towards an increase. Manchester has thus shared in the general improvement, the mortality in 1891-95 being less than the mortality in 1881-85 by 13·6 per cent.

TABLE C.

ANNUAL RATES OF MORTALITY FROM PHTHISIS IN MANCHESTER.

Quinquennial Periods						Average 15 years		
1881-85		1886-90		1891-95		1881-95		
2·42		2·24		2·09		2·25		
1881	1882	1883	1884	1885	1886	1887	1888	1889
2·46	2·41	2·54	2·34	2·34	2·44	2·19	2·14	2·12
1890	1891	1892	1893	1894	1895	1896	1897	.....
2·33	2·20	2·05	2·05	1·97	2·16	2·00	2·12	.....

When we come to examine the figures for the different districts in Manchester, we are at once struck by the immense disparities amongst them. The populations of the different districts being estimated according to the method of the Registrar-General, we get the following table :—

TABLE D.—AVERAGE ANNUAL DEATH-RATE FROM PHTHISIS FOR THE YEARS 1891-97, AND THE DEATH-RATE FOR 1897, IN THE VARIOUS TOWNSHIPS OF MANCHESTER.

	City	Township	Northern	Southern	Ancoats	Central	St. George's	Cheetham	Crumpsall	Blackley	Harpurhey
1891-7	2.08	3.11	1.29	1.88	2.63	3.52	3.23	1.22	1.03	1.03	1.14
1897	2.12	3.35	1.38	1.83	2.51	3.53	3.84	1.29	1.15	0.75	1.77

	Moston	Newton	Bradford	Beswick	Clayton	Ardwick	Openshaw	West Gorton	Rusholme	Chorlton-upon-Medlock	Hulme
1891-7	0.99	1.55	1.33	1.27	1.26	1.73	1.16	1.70	1.09	2.04	2.36
1897	0.91	1.75	1.22	1.39	0.97	1.47	0.81	1.19	0.97	2.08	2.72

From this it appears that the death-rates for the six years 1891-97 are by far the highest in the Central Division and in St. George's, and then, though with a big interval, in Ancoats. After Ancoats comes Hulme, the interval being a much smaller one; and, after Hulme, Chorlton-upon-Medlock. In 1897 the mortality in Hulme exceeded that in Ancoats.

After these come, in descending order, Ardwick, West Gorton, Newton Heath, and Bradford. In the remaining districts the mortality may be classed as low. Indeed, after Chorlton-upon-Medlock, the remaining districts show a lower mortality than the country generally, a circumstance worth considering.

The following districts show a particularly low rate of mortality: Moston, Crumpsall, Blackley, Rusholme, Openshaw, and Harpurhey. In the first four the death-rate does not reach one-third of the amount attained in the Central and St. George's districts.

Not only so, but the death-rate from phthisis in each of these districts, including Openshaw and Harpurhey, is lower than the phthisis death-rate recorded in any one of the English counties during the years 1881-90, some of them predominantly rural.

These differences are exhibited on the accompanying map.

The figures and map show, then, that the alleged comparative immunity of rural populations from phthisis does not exist, and that the nature of the Manchester soil cannot be held responsible for the prevalence of phthisis in this district. Further, the intensity of the mortality is roughly in proportion to the crowding of the population together, modified, however, by other insanitary conditions, especially want of cleanliness. The district in which there are most persons to an acre is Hulme. But there is probably more real crowding in dwellings in Ancoats, and certainly more in the Central and St. George's districts, in which the lodging-house element is very strong.

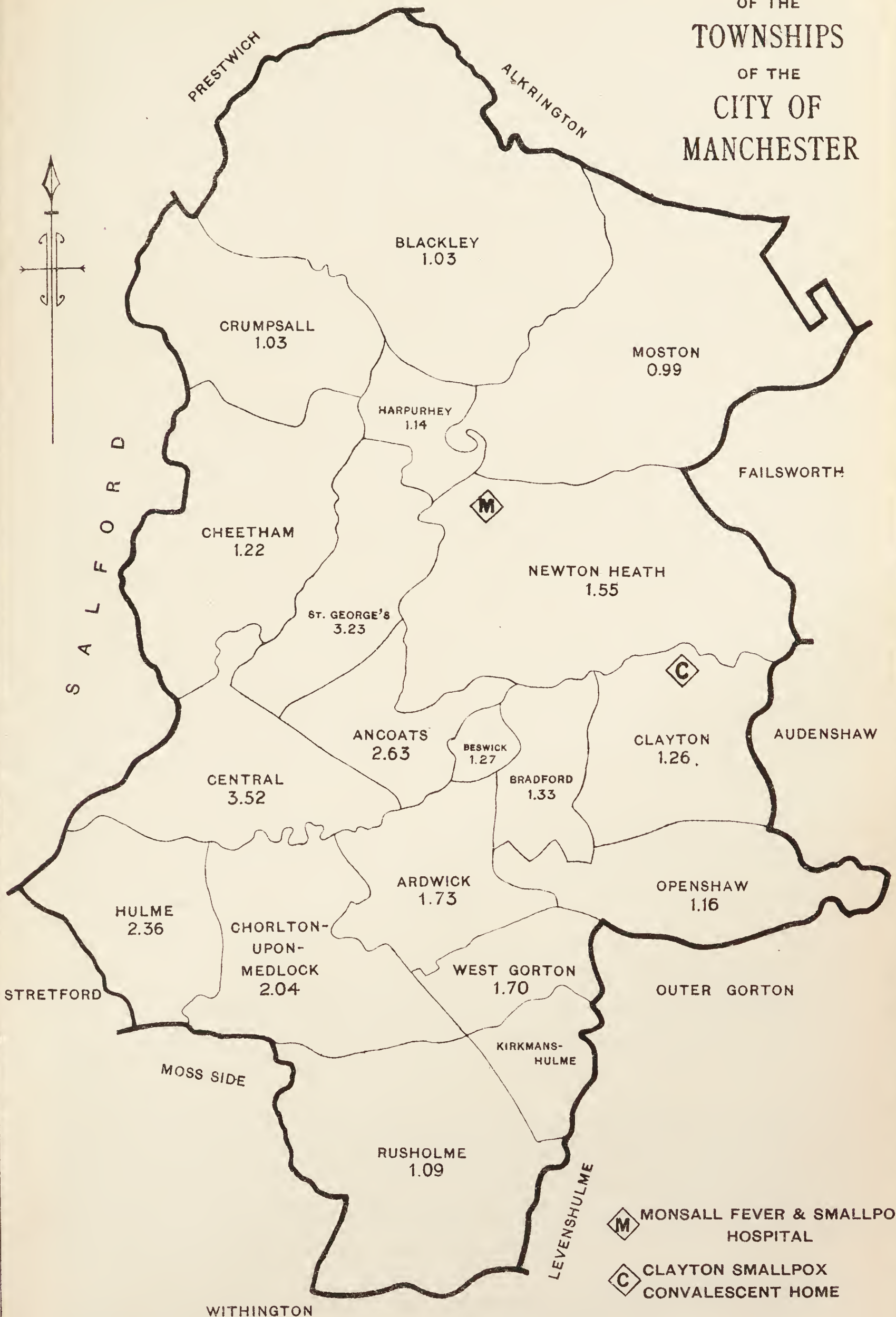
How great an influence is exerted on the death-rates by this factor is shown in this manner. The deaths of persons dying in the workhouse who came from 73 common lodging-houses in the St. George's district was excerpted for the three years 1893-95, when it was found that, with the addition of two deaths occurring in the lodging-houses, they gave an annual death-rate of over 20 per 1,000.

From all this, it will be evident that if the problem of dealing with tuberculosis as communicated from man to man is to be effectually tackled, the struggle will be most intense in the poorest, least sanitary, and most crowded parts of the City.

But we can advance still further on the basis of existing knowledge. Dr. Flick, of Philadelphia, and Dr. Arthur Ransome, of this City, long ago showed that phthisis has a special affinity for particular groups of houses, in which it keeps recurring. Your Medical Officer of Health found the same distribution of the disease in Oldham. Now, since 1893, the Public Health Department in the City of New York has had a system of voluntary notification of the disease, and the cases have been plotted out on maps.

It is thus seen that the houses are affected in blocks, and passed over in blocks. In fact it looks as if one house infected another, rather than that one person affected another. This quite accords with the manner in which we have seen tuberculosis to be propagated inside a house, assuming a certain amount of intercommunication to take place between neighbouring houses. There is no doubt that the same distribution will be found in Manchester,

MAP OF THE TOWNSHIPS OF THE CITY OF MANCHESTER



though not to the same striking extent, because we do not have here, as a rule, the large number living in one building that they do in New York. But, as has been said, Dr. Ransome showed that for several districts the same thing prevailed in Manchester and Salford. Now this can clearly only be dealt with by administrative action on the part of the Sanitary Authority.

We may now consider the magnitude of the task which you are asked to undertake.

The register of deaths for 1897 shows that 1,139 deaths are recorded as from phthisis, 120 from tabes mesenterica, 168 from tubercular meningitis and hydrocephalus, and 193 from other forms of tuberculosis and scrofula.

If attention is fixed on phthisis alone, it may be stated that the most common period from the reception of infection to death is between two and three years. The period is oftener above three years than it is under two, and we may, therefore, conclude that the deaths in 1897 represent a number of cases living in that year more than three times as numerous; that is to say, that there are between 3,000 and 4,000 persons now living who will subsequently die from phthisis.

This takes no account of those who will recover, the number of whom it would be difficult to estimate. For the most part they will not be discovered to be suffering from the disease, and in so far as they escape attention altogether, or do not cough up infectious matter, they will not concern you as a Sanitary Authority. In number they may be estimated at 3,000 more.

Then there are a number of persons with healed phthisis, that is to say, the lungs have been partially destroyed, usually not to a very great extent, and the injured portion has been cut off by healthy surrounding lung which has refused to yield to the assaults of the bacillus.

Dr. Thomas Harris, of this City, found that out of a series of 139 bodies of persons over 20 years of age who had died from diseases not of a tubercular character, 54 or 38·84 per cent. presented the appearance of healed tuberculous disease in the lung.

If we suppose that the same thing would be found to be true if we could examine the lungs of the living, over 100,000 persons would have lungs showing old tuberculous attacks. If even 10 per cent. had experienced passing attacks, there would be nearly 30,000 persons in Manchester over 20 years of age with the scars of old attacks of phthisis in the lung.

It is probable, however, that neither the second nor the third class of case are of very great consequence as regards the propagation of phthisis. It is

chiefly the severer forms of the disease which would have to be dealt with. It is true that a considerable proportion of phthisical persons recover altogether. If the disease is severe, and recovery takes place, as does occur, it is only by aid of the most skilful treatment and under favourable circumstances.

Of the other forms of disease which have been mentioned, consumption of the brain is almost invariably fatal, consumption of the bowel is often recovered from, and tuberculous glands usually end in complete recovery. Tuberculous disease of the bones also, thanks to the skill of the surgeon, is usually recovered from. But every form of the disease is liable, even when it has been quiescent for a number of years, to become active again and to lead to a fatal result by spreading through the system.

Suppose it were possible by a great and sustained effort to reduce the mortality from phthisis by one-half, would the result justify the expense and worry caused in the process? Such a result would be a great victory for sanitary work; but would the economist, who looks, not at the sacredness of life, but at its value to the community, be disposed to look favourably on the expenditure required to reach the end?

Dr. Farr calculated that the average value for all ages of a life was £159, and we are quite safe in saying that the money value of each person saved from a fatal attack of phthisis in Manchester would be at least £200.

Now in 1897 there were 1,139 deaths from phthisis, and to reduce these by one-half would be to save the community a sum of £113,900 annually.

If we add £10,000 a year for a possible saving in expense and loss from other forms of tuberculosis, and from passing attacks of tuberculosis of the lung, we shall be well within the mark.

You may hope, then, to achieve a saving of £120,000 per annum.

Many people have a difficulty in realising that these figures mean a real substantial fact: that each unit per 1,000 added to the death-rate is throwing away so much money. A little reflection shows why this is so. Supposing an individual in any rank of life to die, his substitute is really the infant in arms or as yet unborn. At his work his substitute is not the man who comes in immediately behind him, but the tyro who is just beginning. To replace the tyro needs another addition to the population. Thus for each loss a new unit is required, who must be reared and taught.

Looking at the thing in this manner, one begins to see how the loss of money accrues. Indeed it would not be too much to say that the great saving of life which has resulted from sanitary reforms is one of the greatest supports of the National prosperity, and serves in some measure to counterbalance the loss entailed by deficiencies in other directions.

We may now consider the various ways in which this question may be practically approached. We may proceed :—

1st. By educating the people generally in the precautions which they ought to take in presence of tubercular disease.

2nd. By educating those who are already attacked by tuberculosis in taking the precautions necessary to protect their fellows. Such a process of education will imply that we have a fairly good knowledge of who the individuals are.

The cleansing and disinfection of houses, &c., is evidently an integral part of the struggle, and we require some form of notification if we are to carry out these objects.

3rd. We may provide isolation hospitals at the public expense, and in this way remove many of the infective units in the community. This is a necessary part of any proposal to cope effectively with the disease. It is the aspect of the question which the deputation from the Manchester and Salford Sanitary Association urged most strongly on your attention.

4th. Adequate measures are required to prevent the importation of tuberculous milk into the City. This matter you are otherwise considering, and it need not come under your attention at present.

5th. No effort should be spared to improve the houses of the poor, and to prevent dirt and overcrowding. This subject has for many years occupied your attention, and the facts of tuberculosis will help to animate your efforts. But although the great improvements in the housing of the people which has taken place during the last fifty years, the extensive drainage works, the magnificent water supplies of many of our great towns, the improved circumstances of the poorer classes, especially in the matter of cheap food, the beneficent factory legislation, which, by lightening the strain on the constitutions of the young, has rendered them much less susceptible to tuberculous infection, the improvements in the conditions of labour generally, and other factors of a like nature, have all contributed towards the reduction of phthisis which have taken place, it would be altogether Utopian to think that these influences will suffice to banish this class of affections. It would even be unsafe to rely on a continuation of the improvement which has resulted from the causes enumerated. Unless it should prove possible to counteract the tendency towards overcrowding which has arisen, even now we may have to face a partial defeat. Commercial depression, from whatever cause arising, might also induce retrogression. In any case, whatever the degree of prosperity in the community, and however great the efforts put forth, we shall have for a long period yet crowded and insanitary houses in the heart of our great towns, with a concomitant propagation of tuberculosis, unless further steps are taken.

Indeed the extent and strength of the present movement in favour of a more strenuous and direct mode of dealing with the disease is sufficient admission that the gradual influence of improving social conditions is felt to be quite inadequate to the circumstances.

The procedures which remain to be considered are Education, Notification, and Hospital provision. A considerable process of education has for a long time already been carried on in Manchester, the details of which are given further on. Yet it is certain that all this education has had but a very imperfect influence on practical conduct. Even if those who come under the influence of instruction had a sufficient understanding of, and faith in, the precepts conveyed to carry them into practice, the number of those who have actually to deal with tuberculosis at home, who read handbills or hear lectures, is only but a fraction of the total number concerned.

The large class who inhabit lodging-houses, and there contract phthisis, are almost untouched by any mode of instruction, and, if they were reached, are unfitted, as a rule, by their mental habit from applying the rules laid down, except under constraint of some sort.

Nevertheless, education is a necessary part of the work, were it only in familiarising the more intelligent members of the community with the conception of tuberculosis as a communicable and avoidable disease, and so in securing their co-operation in carrying out necessary measures of prevention. This process must therefore be persisted in by every means which ingenuity can suggest both for attracting attention and ensuring consideration.

Again, isolation in hospital is a valuable means of prevention. As Dr. Leech has insisted, the more patients are treated in hospital the more will a knowledge of the methods of prevention be diffused when these return to their homes.

We have assumed that there are at any one time between 3,000 and 4,000 phthisical persons in the community who are sufficiently ill to require treatment, and who are also in a condition to propagate the disease. One thousand of these we may take to be sufficiently well off not to need isolation in hospital. A large number of the poorest class are at one or another time under treatment in the Union Hospitals, and it will be for the Guardians to consider whether their accommodation is sufficient. The great bulk, however, of phthisical patients would probably not be persuaded to go to hospital, if adequate hospital provision existed, so long as they could continue at work, or, if they did go for a time, it would for the most part serve only to prolong their illness, and it is doubtful how much the aggregate amount of their infective power would be diminished. Thus, in all probability, the chief service rendered by a

hospital would be in the isolation of patients during the latter part of their illness—an invaluable service, indeed, when the phthisical patient was removed from a crowded household, where his presence means poverty and infection.

Moreover, the utility of such hospital treatment would lie, on the curative side, in the provision of prolonged treatment, extending perhaps over years, with an entire absence of strain on the part of the patient. On the preventive side, in the isolation of selected cases, selected because of their special potency for harm, owing to the circumstances of their homes. Such selection, however, would require an intelligence bureau—in other words, some form of notification.

It is clear, moreover, that under any possible hospital scheme the great majority of infective individuals would remain outside, infecting their homes, their fellow-workmen, and their associates.

No hospital scheme is, therefore, alone adequate to cope with the disease, so far as prevention is concerned.

It may be said that “Nothing of the sort is claimed for a hospital scheme : it is only claimed that it would serve to reduce the amount of infection, and so diminish the total amount of disease, with a trend towards its ultimate extinction ; it has the great merit of being voluntary ; it does not mean any pressure being brought to bear on individuals ; it does not propose to interfere with any relationships.” These are its recommendations, and hospital treatment on a larger scale is needed. At the same time, if it stood by itself, it may be assumed that it would not yield results commensurate with the expenditure entailed.

Indeed, it is only necessary to appeal to the experience of the Consumption Hospital to ascertain that, not merely as regards the community, but as regards individual families and individual consumptives, the results are often disappointing.

The patients, while in the hospital, placed under careful nurses, kept to careful habits, and, above all, relieved from the strain of life, improve, and after a few months are discharged. The improvement which has been effected is often but of brief duration. When they are put under the unfavourable conditions of their homes, and exposed to the strain of work, or the stress of domestic worries, they speedily begin to go down-hill again. The weakened tissues again yield to the attacks of the bacilli, and the weakened consumptive may forget in large measure the valuable lessons which he has learned in hospital.

Still, much has been gained in the way of prevention, and very much more would be attained if the duration of treatment could be reckoned, not in months, but in years.

But a system of notification is primarily required. It has already been mentioned that voluntary notification has been in force in New York since 1893, and compulsory notification has recently come into force under what appear to be somewhat disabling conditions. The compulsory notification of cases, other than those which are under public hospitals, brings with it no power even to visit the house where the consumptive patient resides, unless at the request of the medical attendant. If the patient resides in a tenement house or lodging-house, no power is given to visit the house if the medical attendant objects. In the case of patients attending public institutions, however, the Authority retains the right to do what may be necessary to remove infection. There must have been some powerful reasons to induce a Sanitary Authority to pay for the notification of cases under such conditions. When we look at the maps which have been published, we see at once part of the reason.

The disease spreads from house to house until it affects whole blocks; and it is very singular to note how in one part of a district a whole row of houses will be attacked, in another a whole row will be spared.

Notification has thus thrown most valuable light on the administration necessary, and it appears that thorough cleansing and disinfection of the houses affected is a necessary part of the administrative programme, while effective action cannot be taken without a knowledge of where the cases are.

Then, again, there is no question that certain workrooms are centres of infection, and that a system of notification would bring these to light, and enable us to take effective precautions. This is the more requisite, as not only do the workmen at such places infect each other, but there can be little doubt that the manufactured article may serve to convey infection to places remote from the workshop and into homes in which its presence is unexpected. In truth, a complete system of notification will serve to guide administrative action by showing how a maximum of good may be attained with a minimum of effort.

Notification is essential in pursuing a course of education. The most complete use of leaflets and lectures which can be devised will have but a small influence compared with that exerted by the Agent of the Sanitary Authority, who should be a medical man, who would go direct to the consumptive households, many of them not to be reached in any other manner, and show the relatives of the patient exactly what must be done as regards cleansing of the house, ventilation, &c., would indicate important oversights, and would at once impress and advise the householder. This is the most effective mode of educating the public.

Notification, again, is essential if a hospital for consumptives is to be maintained at the public expense. Only by a complete knowledge of the

distribution of cases and of the circumstances of the homes would it be possible to exercise a proper selection of cases to be admitted into hospital, or to judge of the value of such a hospital, and of the extent to which isolation in hospital is required. In fact, without a knowledge of the number and distribution of the cases, the Authority would be in the dark both as to the scope and as to the result of treatment in hospital, so far as prevention is concerned.

It is true that much good might be effected by additional hospital provision for consumptives from the curative point of view only. If, however, we are to do much good in the way of prevention, we must, in the opinion of your Medical Officer of Health, have notification of the disease.

Your Medical Officer of Health submits, therefore, the following scheme for your consideration :—

1.—Suggestions in reference to Education.

A considerable process of education has been already carried out in this district, so far as a general diffusion of knowledge is concerned. The means hitherto adopted have been these :—

1. The Medical and other Officers of the Consumption Hospital instruct the patients in the procedures necessary for the prevention of the disease, and the patients at Hardman Street receive the leaflet of the Manchester and Salford Sanitary Association, giving information as to the precautions to be taken. (Appendix A.)

2. By the assistance of the police, a leaflet containing information relative to the prevention of tuberculous disease has been distributed on three different occasions to every house in the City. This leaflet was issued first in May, 1894, and offers disinfection free of charge upon application. (Appendix B.)

3. A circular letter was sent to the medical men of the City, calling their special attention to the desirability of devoting as much care as possible to the prevention of the disease, and was accompanied by the Memorandum of the North-Western Branch of the Medical Officers of Health. (Appendix C1.)

4. In the course of their house-to-house inspection, the Visitors of the Ladies' Health Society make inquiries as regards the health of the inmates, and in all cases in which they are informed that there are cases of consumption in the house, they leave the official paper of instructions. (Appendix B.)

5. In every instance where a death is registered as occurring in any house, the Inspector calls and offers disinfection at the expense of the Corporation.

In about half the number, the house is cleansed and disinfection is carried out. In many instances, however, the householder prefers to carry out the Esmarch method of disinfection on the walls.

6. A memorandum has been sent to all cowkeepers supplying milk to the City. (Appendix C2.)

7. Many popular lectures have been given under the auspices of different bodies. It will thus be seen that a considerable process of education has been already carried out in this City.

Nevertheless, these agencies may be extended with advantage, thus—(a) The example set by the Hospital for Consumption may be usefully taken up by other Public Institutions. The Sanitary Committee might invite the authorities in the other hospitals to co-operate with them by issuing leaflets with precautions appropriate to the different classes of cases.

(b) A further circular letter should be addressed to medical practitioners asking for their co-operation.

(c) The aid of the Clergy of all denominations should be invoked, and also of the School Board, as well as of the managers and teachers of schools.

(d) Copies of the Official handbill of the Corporation should be sent to the managers of institutions in which a number of individuals are assembled.

(e) Employers and people working in enclosed spaces should be called upon to see that spitting on the floor, walls, or furniture is not allowed in the workroom, and that any workman or working-woman affected with a chronic cough takes such precautions as will prevent them from being a source of danger to others in the workshop.

(f) A communication should be sent to publicans, inasmuch as it is probable that public-houses play a considerable part in the propagation of phthisis.

(g) A communication should be addressed to the keepers of common lodging-houses, and of registered lodging-houses, asking them to post a notice in regard to cleanliness.

Administrative action is also required in order to keep such houses cleansed and disinfected.

(h) The railway companies should be asked to put up a notice in railway carriages, or at least in smoking carriages, and in such others as appear to require a notice. The great importance of thoroughly cleansing cars should be insisted upon.

It should be repeated, however, that the great work of education must be done in the home of the consumptive, by skilled Medical Officers of the Corporation.

2.—*Notification of Phthisis.*

Your Medical Officer has already expressed his opinion that, without some effective form of notification, the problem of dealing successfully with the prevention of tuberculosis cannot be solved. Even for a successful process of education, it is necessary to ascertain where the cases are, so that instruction and guidance may be given just where they are needed.

To conduct a Municipal Consumption Hospital it would be necessary to have all particulars about individual cases, so that the most useful selection of cases might be made, and registration of cases would be of great value to a voluntary institution in the selection of cases.

In order, moreover, to carry out those processes of disinfection and cleansing, which a study of the distribution of phthisis in New York shows to be an essential part of prevention, it is necessary to know where the cases are.

It has been suggested that a system of voluntary notification should be instituted. It would certainly be better to have voluntary notification than to do nothing. But it should be stated that not to make notification compulsory will place those medical men who are impressed with the necessity for action at a grave disadvantage.

A medical man cannot report cases of a disease, when his neighbours are not doing so, without running the risk of losing his patients. He is, however, in a very different position if there is a legal obligation upon him to report all cases. Then, again, with a partial system of notification, we should not obtain the same information in regard to the causes of the disease as we should if notification were general and tolerably complete.

But, for all that, your Medical Officer of Health is of opinion that it would be far better to at once institute a system of voluntary notification than to omit this most essential part of any connected scheme for preventing tuberculosis.

Indeed, there is no reason why the Council should not at once adopt voluntary notification, while applying to the Local Government Board for compulsory powers.

It is, no doubt, to be apprehended that, if notification is made compulsory and worked in such a manner as to be objectionable to the intelligence or prejudicial to the interests, or even to the feelings of the medical profession, it will prove a failure, and very little good will be done. But the same thing is true of the notification of other diseases than phthisis.

You cannot, without endangering the whole working of notification, carry administrative action further than is agreeable to the views of the medical profession as a body. Nothing is easier than to defeat a law unpopular in its essence, or carried out without careful regard to the feelings of the patients and of their medical advisers. This is, however, a question of judicious administration and not one of principle.

That touch of compulsion which recommends itself to the reason of the medical profession and of the community is the best of all educational processes. Many persons in the least sanitary districts will pay heed to the lessons of their advisers when they find that it is more unpleasant and more unprofitable to neglect than to adopt them.

There are, however, difficulties connected with the notification of tuberculosis which do not attach to the diseases at present notifiable.

The ordinary infectious diseases are of comparatively short duration, and it is, as a rule, easy to keep those affected with them under observation. In the case of phthisis and other forms of tuberculosis, the duration of the disease is as a rule measured in years, and it may not always be easy to pursue the migrations of the patients. The same cases come under the notice of different medical advisers at different times, and this circumstance is liable to increase the expense of notification and administration.

We have seen, however, that not only is the patient a continuing personal source of infection, but the house in which he lives becomes a source of infection. This is a circumstance which must be borne in mind, since, if a phthisical person has continued to inhabit a house for a considerable period, there is no doubt that the next tenant will be exposed to decided risk. This risk it should be the business of the Sanitary Authority to avert. Here is another reason why notification should be general and compulsory.

These and other difficulties impart special features to the notification of tuberculosis.

A sufficient answer, however, to those who advance difficulties is that notification of tuberculosis has actually been carried out in New York, and that

the working of a system of Voluntary Notification would appear to have been so successful that notification, under certain conditions, is now compulsory over the whole city.

Who, then, are the persons who should be notified to the Sanitary Department? Clearly those who may be expected to propagate the disease.

1. Phthisical persons with muco-purulent discharge from the lungs, or discharging sputum in which tubercle bacilli can be demonstrated, or phthisical individuals whom for any reason the medical practitioner may judge to have reached the infective stage.

2. Cases of consumption of the bowels, and cases of tuberculosis with diarrhœa.

3. Cases of tuberculous bones with discharge, cases of discharging tuberculous glands, and cases of tuberculous ulcers.

Having regard to the difficulties already mentioned, the following tariff of fees for notification is suggested :—

First notification of a case of tuberculosis by a private practitioner, 2s. 6d.

Notification of a case previously notified by another medical practitioner, 1s.

Notification by a medical practitioner of change of address of a case previously notified, otherwise than into a public institution, 1s.

Notification on behalf of public institutions of cases not previously notified by medical practitioners, or of a change of address of a patient, 1s.

It may be taken provisionally that the average total fee for each case notified would thus work out to about 2s. 6d.

Suppose, now, that notification had been adopted, what would be the probable number of cases?

The number of deaths from phthisis being 1,139, the number of cases subject to notification could not safely be estimated at less than 3,000.

Your Medical Officer of Health may seem to have taken a comparatively low figure. It must be remembered, however, that the most common period between infection and death is about three years. It is true that people in easy circumstances live much longer. But the absence of strain is the most powerful curative agent in the repertory of the physician. Then, again, it is probable that a large number of cases would not be notified at all until the disease was well established.

What would be the number of other forms of tuberculosis notified there are no means of determining. It could not well, however, be put at less than 1,000.

It is evident that the work of tabulating the cases would be considerable.

Two registers would be kept, one of names and one of addresses, as in regard to any cases reported it would be necessary to find out whether they had been previously reported, and whether there had been any change of address.

Assuming that 3,000 separate cases were reported in a year, the amount paid in notification fees would be £375.

After the first year, however, the number of cases would be reduced to say 2,000, and the annual sum paid for that number would be £250.

A special clerk would be required at, say, 30/- a week, amounting to £78 per annum.

The chief expense would, however, be entailed by the administration and inspection.

Clearly the greatest stress would be experienced at the outset. It would be necessary to appoint medical men as inspectors to deal with cases reported by private practitioners, and they would require each at least £200 per annum of a salary. How many would be required?

In recording the particulars relating to 3,000 people in a useful form, a great amount of work would have to be done.

A medical man could not be expected to overtake more than 20 cases in a day, and give all necessary particulars. To overtake all the cases would take him 150 days. Three medical men would take 50 days, a reasonable time to give for preliminary inspection and record.

This staff, however, would require to be kept up, since the administrative action consequent on inspection would entail considerable supervision. Then, again, additional work would be required in the way of disinfection, and to some extent in other ways.

The cost of disinfection may be estimated at £1,000 a year. Travelling expenses, printing, &c., may come to £150. Thus, the total additional office work and administrative work would amount to over £2,200 per annum, supposing only phthisis dealt with, a sum which should be increased to £2,500 to allow for additional services required.

There are, however, considerations which modify this estimate. In the City of New York compulsory notification has been made law on condition that an Inspector does not visit the house where the case is reported by a private medical practitioner, unless requested so to do by the practitioner.

This arrangement does not appear to me quite satisfactory, although it is probably imposed on the authority by the magnitude of the work.

The services of the Sanitary Inspectors might be available for a number of the cases reported from Institutions for carrying out measures of prevention.

Your Medical Officer of Health suggests that the following understanding with medical practitioners would form a satisfactory basis of working :—

“In all cases reported by a private practitioner, your Inspector to call
 “at the house and make a record of the circumstances requiring to be
 “noted on the form of the Medical Officer of Health, and to give general
 “instructions as to the sanitation of the house, but not to give directions
 “as regards the personal habits of the patient, unless authorized to do so
 “by the medical attendant. He would, however, be at liberty to leave
 “a general paper of instructions as regards preventive measures.

“No visit to be paid to the house in those cases in which the medical
 “attendant expresses a decided objection, provided he is willing himself
 “to fill in the office form, to give all necessary instructions, and to take
 “charge of disinfection, to be carried out in the manner usually employed
 “by the Health Department.”

In the absence of any means of accurately gauging the number of cases to be dealt with, the experience of New York is very valuable. The figures available for the years 1894, 1895, and 1896 are :—

	Estimated Population	Number of cases of tuberculosis reported
1894.....	1,809,353.....	4,166
1895.....	1,879,195.....	5,824
1896.....	1,934,077.....	8,334

These are the figures under a system of voluntary notification. No doubt under the new compulsory Enactment the numbers will increase.

The following Circular, issued by the Board of Health, gives an account of the addition to the Sanitary Code made on January 19th, 1897, and explains the objects and limitations of notification as adopted in that City :—

CIRCULAR OF INFORMATION TO PHYSICIANS

*Regarding the Measures Adopted by the Board of Health for the
 Restriction and Prevention of Tuberculosis in the City of New York.*

It is well known to the physicians of the City of New York that for a number of years the Health Department has been earnestly engaged in

the study of tuberculosis, the most wide-spread and fatal disease occurring in this city, and in the initiation of such measures for the curtailment of its ravages as seemed practicable and imperative.

From the beginning of this work the Board of Health has recognised the fact that, while tuberculosis is unquestionably a communicable disease, yet the liability to its transmission may be so greatly diminished by simple precautions as to sharply separate it from those diseases properly classed as contagious. It is to be remembered that, while tuberculosis is always the result of direct infection, yet it is far less readily communicated than such diseases as small-pox, scarlatina, etc., and that if proper sanitary conditions can be secured in each case, there is little danger of the transmission of the disease to others. The sanitary supervision of this disease should, therefore, be considered largely on the merits of individual cases and conditions, or of classes of cases and conditions.

Thus, in its "Circular of Information for Consumptives and those living with them," the Health Department has emphasized these facts: That a person suffering from consumption may, if his sputum be properly cared for, pursue his usual avocations without endangering others; that the disease is often curable, and that early recognition greatly enhances the chances for recovery. As this relatively innocuous character of pulmonary tuberculosis is absolutely dependent upon the intelligent observation of simple and obvious measures for the disposal of the sputum, the earlier efforts of the Board were largely either educational or directed to the collection of knowledge regarding such cases, or groups of cases, as seemed to constitute the most serious menace to the welfare of the public.

On February 13th, 1894, the Board of Health passed a series of resolutions designed to assist in the accomplishment of its aims in the suppression of tuberculosis. One of these resolutions involved the reporting of certain classes of cases of tuberculosis, and, in compliance with it, 4,166 cases were reported in 1894, 5,818 in 1895, and 8,344 in 1896, and the Department was enabled, without opposition and without the imposition of hardships upon individuals, to extend its educational influence and to protect a large number of persons from risks, which, without such measures, must inevitably have led to further serious spread of the disease.

In order to more firmly establish and to extend the work carried on under the measures above mentioned, on January 19th, 1897, the following amendment to the Sanitary Code was adopted by the Board of Health:

"Sec. 225.—That pulmonary tuberculosis is hereby declared to be an infectious and communicable disease, dangerous to the public health.

It shall be the duty of every physician in this city to report to the Sanitary Bureau, in writing, the name, age, sex, occupation and address of every person having such disease who has been attended to by, or who has come under the observation of, such physician for the first time, within one week of such time. It shall also be the duty of the commissioners or managers, or the principal, superintendent or physician, of each and every public or private institution or dispensary in this city, to report to the Sanitary Bureau, in writing, or to cause such report to be made by some proper and competent person, the name, age, sex, occupation and last address of every person afflicted with this disease, who is in their care or who has come under their observation within one week of such time. It shall be the duty of every person sick with this disease, and of the authorities of public and private institutions or dispensaries, to observe and enforce the sanitary rules and regulations of the Board of Health for preventing the spread of pulmonary tuberculosis."

This section of the Sanitary Code, in effect, gives legal force to the measures which had been provisionally adopted by the Board under resolutions three years earlier. It will be noted that in this section of the Sanitary Code, pulmonary tuberculosis is classed as an "infectious and communicable disease, dangerous to the public health," and is not grouped with the contagious diseases.

The following circular of information to physicians regarding the measures adopted by the Board for the restriction of this disease was originally published in 1894, and was then forwarded to every physician practising in this city. It is now re-issued by the Department, after being slightly modified to correspond with the provisions of the above amendment. It describes, in sufficient detail for the information of physicians, the purpose of the Health Board and the scope of its work in relation to tuberculosis. The circular follows :

"The communicability of pulmonary tuberculosis has been so thoroughly established, and is now so generally recognized by the medical profession throughout the world, that the Board of Health of New York City has determined to take active steps looking toward its prevention in this city, and has adopted the following measures :

"First—The Health Department will hereafter register the name, address, sex, and age of every person suffering from tuberculosis in this city, so far as such information can be obtained, and will require that all physicians furnish such information to the Sanitary Bureau, as provided in the above section of the Sanitary Code (postal cards for reporting cases of tuberculosis will be forwarded on application). This information is solely for record, and in no instance will visits be made to such persons

by the inspectors of the Department, nor will the Health Department assume any sanitary surveillance of such cases, unless the person resides in a tenement-house or lodging-house (unless in other cases the attending physician requests that an inspection of the premises be made). In no case where the person resides in a tenement-house or lodging-house will any action be taken if the physician requests that no visits be made by inspectors, and is willing himself to deliver circulars of information, or to furnish such equivalent information as is required to prevent the communication of the disease to others.

“Second—When the Health Department obtains knowledge of the existence of cases of pulmonary consumption residing in tenement-houses or lodging-houses (unless the case has been reported by a physician and he requests that no visits be made) inspectors will visit the premises and family, will leave circulars of information and instruct the person suffering from consumption, or the family, as to the measures which should be taken to guard against the spread of the disease, and, if it is considered necessary, will make such recommendations for the cleansing or renovation of the apartment as may be required to free it from infectious material.

“Third—In cases in which it comes to the knowledge of the Health Department that rooms or apartments in tenement-houses, lodging-houses, etc., which have been occupied by a consumptive, have been vacated by death or removal, an inspector will visit the premises, and, when necessary, will direct the removal of infected articles, such as carpets, rugs, bedding, etc., for disinfection, and will make such written recommendations to the Board as may be required regarding the cleansing and renovation of the rooms or apartments. An order embodying these recommendations will then be issued on the owner of the premises, and compliance with this order will be enforced. No persons other than those there residing at the time will be allowed to occupy such rooms or apartments until the order of the Board has been complied with. Infected articles, such as carpets, rugs, etc., will, when necessary, be removed by the Health Department, disinfected, and returned without charge to the owner.

“Fourth—For the prevention and successful treatment of pulmonary tuberculosis, it is of vital importance that a positive diagnosis be made at the earliest possible moment. In order that the assistance afforded by bacteriological examinations of the sputa may be at the command of physicians in all cases, *not under treatment in hospitals*, the Health Department is prepared to make such bacteriological examination, if samples of the sputa, freshly discharged, are furnished in clean, wide-necked, *well-stoppered* bottles, accompanied by a blank giving the name, age, sex, and address of the patient, the duration of the disease, and the name and

address of the attending physician. Bottles for collecting the sputa, with blank forms to be filled in, can be obtained at any of the drug stores now used as stations for the distribution and collection of serum tubes for diphtheria cultures. After the sputum has been obtained, if the bottle, with the accompanying blank filled out, be left at any of these stations, it will be collected by the Health Department, the sputum examined microscopically, and a report of the examination forwarded to the attending physician free of charge. The information regarding cases of pulmonary tuberculosis, obtained by the Health Department through such bacteriological examinations of sputum, is solely for registration, and cases of pulmonary tuberculosis thus reported will not be visited by inspectors of the Health Department, nor will circulars be forwarded to them, without the special request of the attending physician.

“Fifth—The authorities of all public institutions, such as hospitals, dispensaries, asylums, prisons, homes, etc., are required to furnish to the Health Department the name, sex, age, occupation and last address of every consumptive coming under observation within seven days of such time. The premises occupied by all persons reported by the authorities of public institutions as suffering with pulmonary tuberculosis will be visited by inspectors of the Health Department, and such action taken as seems necessary.

“Sixth—The authorities of all public institutions, such as hospitals, dispensaries, asylums, prisons, homes, etc., will hereafter be required to furnish to the Health Department the name, sex, age, occupation, last address, and duration of residence in the institution of every inmate suffering from consumption, who is discharged from the institution, previous to or on the day of such discharge.”

It is the earnest wish of the Board of Health that all practising physicians in this city co-operate with the Board in an intelligent and sustained effort to resist the ravages of this, the most prevalent and formidable disease with which we have to deal.

It has been considered desirable in this connection that the various communications and circulars in relation to this disease which have been issued by the Health Department from time to time should be appended, and also that certain other matter bearing upon the extent and communicability of pulmonary tuberculosis should be preserved for convenience of reference.

Respectfully submitted,

CHARLES G. WILSON,
President.

It is suggested by your Medical Officer of Health that—

1. Cases of phthisis only be at first notifiable.
2. That three Medical Inspectors be appointed for a term of one year to carry out the work, and that an additional Clerk be appointed in the Public Health Office.
3. That application be made to the Local Government Board to have phthisis included amongst the diseases notifiable under the Local Act, under certain restrictions.
4. That the consideration of other forms of tuberculosis be meantime postponed, so far as administrative action is concerned.
5. That the suggestions made in regard to further educating work be at once proceeded with, as far as practicable.
6. That medical men be appointed to give lectures to the public on the subject of the prevention of tuberculosis.
7. That a voluntary system of notification be at once adopted, and that arrangements be entered into with the various Public Institutions by which cases of phthisis may be notified to the Sanitary Authority.

3.—Hospital Accommodation for Consumptive Patients.

Your Medical Officer of Health is of opinion that notification of tuberculosis should precede any action which the Corporation may take in regard to a municipal hospital for cases of consumption, so that the magnitude of the need may be accurately ascertained. There can be no doubt, at the same time, that additional hospital accommodation is required, and he would suggest that an interview should take place with the Authorities of the Hospital for Consumption at Bowdon. The objects of that hospital are, however, mainly curative, if partly educational and preventive. The object of the Sanitary Authority would rather be to free families from the dangerous presence of phthisis at a more advanced stage of the disease.

Suppose the Sanitary Authority entertain the idea of erecting a hospital for Consumption, which would fulfil the two purposes of a Sanatorium and an Isolation Hospital, they could scarcely put up a hospital for less than 200 beds.

The cost of such a hospital might be from £80,000 to £100,000, and the annual expense might be about £12,000.

It would be well to have an interview with the Authorities of the Consumption Hospital, with a view to ascertain what their experience has been as to the expenses of maintenance and the effects of isolation, and the guidance of the Medical Staff of that hospital should also be sought.

It does not appear to your Medical Officer of Health that there would be any advantage in having a hospital for a larger area than Manchester, or, at all events, than Manchester and Salford, unless the hospital accommodation were correspondingly increased.

4.—Bacteriological Examination.

In New York and at Brighton, where a system of voluntary notification is at present in force, facilities are given to medical men for the early diagnosis of cases of phthisis by the examination of samples of sputum in the municipal laboratory. The concession of such facilities would probably assist the Corporation in rendering a system of voluntary notification more complete. It would concern institutions to only a slight extent, and where the patients could afford to pay, the examination would be otherwise conducted. It is not anticipated that the expense of bacteriological examination would be heavy. Possibly it might reach £250 a year.

JAMES NIVEN,

Medical Officer of Health.

The recommendations contained in the following statement by the Chairman of the Sanitary Committee to the City Council were accepted by the Committee as the initial steps needed to introduce the scheme.

Statement.

It will be in the recollection of the Council that on the 3rd May, 1899, the Council approved of the estimate of your Committee, amounting to £1,500, for expenses to be incurred in the present financial year in carrying out a system of voluntary notification of phthisis.

Your Committee on the 28th June, 1899, took into consideration the procedure to be adopted for carrying out such a voluntary system, and the

following suggested procedure was submitted by the Medical Officer of Health for the consideration of your Committee :—

Notification of Phthisis.

1. It will be necessary to keep a double register—one of persons, the other of houses.

The first register will contain a record of the name, sex, age, residence, occupation, place of work, and stage of illness of the phthisical person at the time of notification.

The second register will contain a record of the address, name, sex, and age of the phthisical person.

2. These registers will require revision every six months, so as to form an index in alphabetical order of the names and addresses respectively for purposes of reference.

3. It will be necessary to arrange with the chief public institutions to notify all fresh cases of phthisis attending them.

Each public institution will need to be furnished with a book in which the particulars above given may be recorded.

It is therefore necessary for this Committee to approach the different hospital authorities, so as to arrange for such a book being kept. The Committee will probably wish to furnish the register to the institutions.

A clerk will call for the register once a week.

4. It will be necessary to arrange for the payment of fees.

The following Scale of Payments has already been accepted by the Committee :—

For each report of a case not previously reported, when reported by a private medical attendant, 2s. 6d.

For each report of a case previously reported from another source, 1s.

For each report of a change of address of a phthisical case, the new address being reported, 1s.

For each fresh case reported from a public institution, 1s.

For each change of address reported from a public institution, the new address being reported, 1s.

5. Assuming the public institutions to fall in with these arrangements, a medical man should be at once advertised for at a salary of £200 a year.

6. The duties of this medical man would consist in visiting the cases at their own homes, investigating the circumstances under which the disease had been contracted, and the conditions and arrangements of the home. He would report on a prescribed form to the Public Health Office, and steps would then be taken to carry out the necessary measures of disinfection at the house affected, which the medical man appointed for the purpose would arrange after consultation—for a time at all events—with the Medical Officer of Health.

7. He would also, for Institution cases, carefully describe the precautions requiring to be taken by the patient, and in the management of the house, and would leave printed instructions.

8. As far as possible he would see that those precautions were carried out.

9. In cases attended by private practitioners he would, unless requested to do so by the Medical Attendant, avoid giving personal instructions to the patient, which the Medical Practitioner would himself give.

10. It is suggested that, in order to distribute the work, Public Institutions should first be dealt with, and that these should, therefore, be approached as soon as possible.

11. In certain cases, examination of sputum from phthisical persons will be required. It is desirable that arrangements should at once be made for this being done.

The above report has been adopted by the Sanitary Committee and by the Council, and the sanction of the Council has been given to the initial steps required to carry it into effect, mentioned on the preceding pages. The Chairman of the Sanitary Committee at the same time assured the Council that there was no intention of raising the question of compulsory notification for some time, and that, when raised, it would be specially submitted to the Council.

HOUSING OF THE WORKING CLASSES.

The proper provision of houses for the working classes is one of the gravest, and at the same time, perhaps, the most difficult problem which modern sanitary reformers have to encounter. In the present report, I purpose to do no more than merely indicate a few of the considerations with which the Council have to deal, reserving for consideration the various factors of the problem. We may, however, obtain some light from our statistics, and from the experience of others; although it seems to me that nothing short of a detailed investigation of the circumstances of work of all the inhabitants of the City will enable us to grapple successfully with the difficulties existing, and impending.

In a paper recently read by Mr. Costelloe before the Manchester Statistical Society, a picture is drawn of the conditions of housing of the poor in London, which is nothing less than awful. According to Mr. Booth, a quarter of a million are living below—what he calls—the line of poverty:—

“A vast multitude of the poor are dependent on irregular employment, “people, *e.g.*, employed in tailoring, on the river, and about the theatres and “markets. Their labour is absolutely unorganised, and it is vital to them to “live near their work, so that they may be constantly waiting for employment, “and ready to pick up what is going.”

“The value of rooms over great areas of the City for business purposes is “vastly in excess of their value for housing purposes, so that as rapidly as the “leases fall in the sites are cleared, and business premises erected. Many “rooms formerly used as dwellings are for this reason now occupied as “offices. The people displaced go anywhere.”

“In particular, this process has gone on within a large area round the Bank “of England, and the result is that the value of rooms at greater distances has “become so enhanced that the rents are raised to a point that compels over- “crowding to an amount, and of a kind, incompatible with decency.”

In the Schemes of Improvement which the London County Council have carried out, it has been found possible to rehouse only a portion of the people displaced, and this at a great pecuniary sacrifice. Vast improvements have, however, been carried out by private companies, which have taken the form of tenements in blocks, let, for the most part, at very high rents. It may be assumed that in these overcrowding prevails as a mere economical necessity, and in the most vital of sanitary requirements no improvement of any magnitude is effected. Yet Mr. Costelloe assumes that schemes of this nature are, in the present state of things, unavoidable, whether at the expense of the rates or not.

The alternatives which he offers are organisation of all classes of labour, and an entire revolution in the means of transit to suit the convenience of the working classes. Amongst the changes which would be necessary in respect of transit would be trains running from 5-0 a.m. to 9-0 p.m. ; every quarter of an hour in the morning, and the same in the evening ; a great central station ; communications between the different lines of railway ; and tickets utilisable on different railway lines.

The tram service would have to be reorganised with a similar object, and with central communications in the City.

Much, as he justly observes, might be effected by such a thorough alteration in the transit service, but the problem of casual labour would remain untouched. He shrinks from the attempt to organise such labour, and the task is evidently gigantic. Yet the advantages in regard to the moral and hygienic well-being of the community of a successful effort to grapple with this problem are such that it may be hoped that an effort will be made in this direction.

Mr. Costelloe considers that the extensive use of bicycles which now prevails has added greatly to the possibilities of the expansion of working class houses over greater areas. It is very doubtful, however, whether any progress has been made here in the utilisation of the bicycle for this purpose. Manifestly three things are needed to make this a material contribution to the solution of the difficulty, viz., cheap cycles, waterproof and not too expensive clothing, and convenience for storage. These difficulties it may be assumed will be overcome, and must, one would suppose, have been overcome in London, when Mr. Costelloe can speak so positively on the subject.

Less, meanwhile, has been done in Manchester to meet the demand for reconstruction on areas in the centre of the City than has been done in London, Glasgow, Birmingham, and Liverpool. It is true the conversion of back-to-back houses has been a useful work, steadily pursued for many years in the face of much opposition, and recently the insanitary areas which up to now have been condemned in this City have been covered with dwellings. One of these areas has been used for the erection of a model common lodging-house, the precursor, it may be hoped, of others erected and managed by the Corporation. Whatever difference of opinion may exist about other classes of dwellings being erected and managed by the Corporation, there can be no doubt that it is a distinct gain to the public welfare to have such lodging-houses under careful supervision.

In the dwellings recently erected by the Corporation there has been a distinct reversion to the Lancashire type of dwelling, viz., separate cottages. The same tendency is also manifested in Liverpool. The hygienist can assuredly find no fault with this tendency, although it implies a clear recognition

of two principles, viz. : (1) that there are at present too many people housed on a given area, and (2) that in rebuilding on insanitary areas it is not desirable to place on them the number of persons displaced.

Supposing working-class families compelled to move outwards, whether by force of commercial enterprise or by the smaller operations of the Sanitary Committee—smaller, that is, in point of absolute magnitude—what are the dwellings like to which the displaced artizans have to go?

The improved building bye-laws of the City have made it certain that those who obtain the cottages recently built within the City will have healthier homes than those who inhabit the older houses. What about the houses outside the City boundary? It was pointed out by Mr. Costelloe and by other speakers at the meeting of the Statistical Society that the new houses in those districts outside, in which less efficient building bye-laws prevail, may be of a quality far inferior to those newly built within the City, and that we are in danger of reproducing slums outside. In that case the efforts of the City Council to improve the conditions of the working population are liable to be rendered nugatory. It calls assuredly for the consideration of the Council of this City, and of others in like circumstances, whether it may not be possible to have a uniform code of building bye-laws imposed on all districts within such a distance of the centre of our large towns as will make it impossible thus to foil the efforts of the towns at improvement.

Another question which has arisen in connection with the rehousing of the people is the taxation of ground values. No doubt this procedure would help to defray the expense of furnishing the working-class with better dwellings, but it would not make it possible to allocate costly sites near the centre of the City to artizans' dwellings without loss.

What, now, are the conditions which force the question of housing the working classes on the attention of the sanitary authority. These may be said to be—

Overcrowding.

Large areas of houses which are now regarded as, or have become, unfit for human habitation

(a) Structurally ;

(b) From other causes.

Altered economical conditions.

Overcrowding assumes two forms which may, and usually do, go together, but which have no necessary connection,—viz., crowding on area and crowding of living rooms.

It is manifest that the number of persons housed per acre, unless very excessive, is not a sufficient index that overcrowding exists to an unwholesome extent. Where, as in London and Glasgow, you have large numbers of dwellings in flats, you may have, and in parts of London doubtless do have, less crowding of rooms than occurs in parts of Manchester and Liverpool, where the people prefer to live in cottages, and where consequently you cannot, with due regard to the requisite conditions of light and ventilation, put anything like the same number of people on the same area as in London or Glasgow.

Having, meantime, directed our attention to this distinction, we may now glance at the degree of crowding on area which prevails in the principal centres of population. From the Registrar-General's Annual Summary we find that the number of persons calculated to be living on an acre of ground in the middle of 1897 was—

	Population		Persons to an Acre		Death-rate
London	4,463,169	...	59·8	...	18·2
West Ham	273,682	...	58·2	...	15·7
Brighton	121,401	...	48·0	...	15·1
Bristol	232,242	...	49·7	...	17·2
Birmingham.....	505,772	...	39·8	...	21·6
Liverpool.....	633,078	...	47·8	...	24·4
Manchester	534,299	...	41·4	...	23·1
Salford	213,190	...	41·2	...	23·9
Leicester	203,599	...	23·7	...	17·7
Nottingham.....	232,934	...	21·2	...	18·8
Bradford	231,260	...	21·4	...	17·4
Leeds	409,472	...	19·0	...	19·9
Sheffield	351,848	...	17·9	...	21·2
Hull	225,045	...	27·4	...	18·6
Newcastle.....	217,555	...	40·5	...	19·1

London has, therefore, a far greater number of persons per acre than any of the smaller cities, closely followed by West Ham. After these two come Brighton and Bristol.

It is a very remarkable fact that the death-rate of London is steadily under 20 per thousand, while the death-rates of the three other large centres of population mentioned are remarkably low.

In the case of London, it is true that there is a large section of the population in easy circumstances, and but little exposed to the stress of life, while the picked lives of the country find their way to the Capital.

West Ham is probably in large measure a colony of comparatively well-to-do people. Brighton is a health resort. But these set-offs do not apply to Bristol, and it is evident that something more than mere crowding on area

is necessary to produce the high mortality which prevails in Manchester and Salford, and also in Liverpool.

As we have seen, Mr. Costelloe states, on the authority of Mr. Booth, that a million and a quarter of the inhabitants of the Metropolis are below the line of poverty. It cannot, therefore, be poverty which makes the difference in favour of London.

It cannot be irregularity of employment, with all the misery which it engenders, since there can be no reasonable doubt that there is far more irregularity of employment in London than exists in Manchester in proportion to the population.

No doubt, the more persons are crowded on an area the greater will be the liability to certain forms of infectious disease, no matter what sanitary improvements may be made. This is true of measles, whooping cough, influenza, scarlet fever, smallpox, and probably of diphtheria. This disadvantage, however, does not weigh seriously against the total gain in health obtained by housing the population in well-constructed tenement dwellings.

It is impossible to obtain accurate data with reference to the improvements which have been effected by this means in London and Glasgow, since the statistics of mortality are affected with one great source of error, in that the population inhabiting such improved dwellings is a selected one.

In a paper given by Dr. Russell, in 1888, he gives a description of the housing of the working classes in Glasgow, which to us seems well-nigh incredible :—

“At that period, the average density of population was 84 persons per acre, the local density varying from 25 to 348, in the 24 sanitary districts into which the City was then divided.

“In every 100 of all houses in Glasgow, there were 30 of only one apartment; 44 of only two apartments; 15 of three; and only 5 of five apartments and upwards.

“Of the inhabitants of Glasgow, 25 per cent. lived in houses of one apartment; 45 per cent. in houses of two apartments; 16 per cent. in houses of three apartments; 6 per cent. in houses of four apartments; and only 8 per cent. in houses of five apartments and upwards.

“You must not think of the inmates of those small houses as families in the ordinary sense of the term. No less than 14 per cent. of the one-roomed houses and 27 per cent. of the two-roomed contain lodgers—strange men and women mixed up with husbands and wives and children within the four walls of one small room.”

Admirable work has been done by the municipality of Glasgow during the ten years which have intervened since these statistics were published. But it is not in ten years that a revolution can be effected that will remove more than a small part of this condition of things. Yet the death-rate of Glasgow does not differ materially from the death-rates of our great northern cities.

Is it in the conditions of industry that we are to look for the explanation of our continued and terrible mortality, so miserable and so costly? Liverpool heads the list, and owns no industries which can in any way explain the death-rate, at all events as the result of direct physical strain. Moreover, there can be no doubt that much of the great mortality of Liverpool is due to overcrowding and other insanitary conditions in the centre of the City.

Dublin is another city, the terrible mortality in which testifies to the fact that it does not need the adverse influences of severe physical strain or special industrial influences to produce a high rate of mortality.

In truth, the high death-rate of Manchester is, in the main, not due to this cause. This matter deserves, perhaps, a little treatment in detail in order that we may not be impeded in our view of the causes of our exceptional mortality by the suggestion of special industrial causes.

The chief special industries of Manchester are cotton manufactures, printing, dyeing, and bleaching, and iron works of various kinds.

The populations engaged in these occupations were given by the Census of 1891 as:—

	Males		Females		Total
Printers, dyers, and bleachers (cotton)..	3,098	.....	476	.....	3,574
Engaged in cotton ...	5,971	.....	16,247	.....	22,218
Machine makers	7,200	.....	196	.....	7,396

Turning, now, to the tables of mortality for different occupations given by Dr. Tatham in his recent report, we find that for the years 1890-92 the mortality figures for cotton operatives do not reach the figures for all males till the age of 45 is reached.

The same is true of machine makers.

The mortality of printers, dyers, and bleachers is, it is true, excessive at all ages, but the number engaged is too small to make any material alteration in the total industrial mortality.

This is still more the case in regard of other occupations, such as chemical manufactures, file-making, glass-making, &c.

Thus the excessive mortality amongst the inhabitants of Manchester at all the higher ages is not a direct industrial mortality.

We may arrive at this conclusion in another manner. With the exception of dock labourers, there is no large class of workpeople in Liverpool which should show a high mortality, and amongst these the influences inimical to health are only indirectly due to their occupation.

We found in the Annual Report of the Medical Officer of Health for the year 1896 that the chief and special incidence of mortality in Manchester was in respect of chest diseases, which at all industrial ages was much heavier in Manchester than in London, or over England generally.

Now, if the heavy respiratory mortality in Manchester were due either directly to industrial causes or were indirectly owing to excessive contamination of the atmosphere, the deaths from respiratory disease at industrial ages ought to be far more numerous in Manchester than in Liverpool. Unfortunately, the groups of ages into which the deaths are divided in Liverpool do not correspond with those in which we have arranged our deaths, and it is not possible without a special rearrangement of deaths to populations to get corresponding figures.

The total deaths for 1896 are, however :—

	Manchester		Liverpool
Phthisis	1,078	...	1,198
Bronchitis	1,246	...	1,810
Pneumonia..... ..	1,384	...	1,101

We thus see that the mortality from phthisis does not materially differ in the two cities ; while the mortality from other forms of chest disease, though greater in Manchester, is not very much greater. Liverpool is afflicted with an excessive respiratory mortality as well as Manchester.

We must conclude, therefore, that though the atmospheric impurities probably do exercise some influence, they are not the chief agents in producing the high respiratory death-rate of Manchester.

We may obtain further light on the same subject by an examination of the relative mortalities in different districts of Manchester. The occupations which might be expected from their nature to affect most unfavourably the districts in which they lie are to be found more especially in Newton Heath, Clayton, Bradford, and Openshaw. When, however, we come to compare these, whether as regards their general or their respiratory death-rate, we come to precisely the same conclusion that we have drawn from a comparison between Manchester and Liverpool: that though we cannot acquit these industries of some share in the mortality, it must be only insignificant compared with that which is due to other causes.

It is true that the high mortalities of Manchester and Salford, and of Liverpool, are approached by those of several other industrial centres, such

as Leeds and Sheffield ; but, as we shall see, there are other causes of a high mortality which are common to most, if not all of them, with the exception of Liverpool. That climate has nothing to do with it is sufficiently shown by the remarkably low death-rates prevailing in suburban populous districts of our large towns, as well as in many of the smaller centres of population.

But if it is not the industries of our large towns, either directly or indirectly, and if it is not the climate of this part of the country, to what then is the high mortality due?

We are thus led back to the subject of overcrowding. As before, we may consider the question of crowding from two points of view—crowding on area and crowding in rooms. Now in Liverpool there is a remarkable degree of crowding on area, which in the more central parts of the City is only comparable with that prevailing in Glasgow. There is no such degree of overcrowding on area in Manchester.

The following are the figures estimated for the year 1898, starting with the most crowded districts :—

District	Persons to an acre	Death-rate, 1894-98
Hulme	151	23·7
St. George's	128	27·3
Ancoats	114	28·8
Beswick	114	18·0
Chorlton-upon-Medlock	96	19·6
West Gorton	82	20·8
Bradford	81	22·3
Ardwick	74	21·1
Harpurhey	65	18·6
Openshaw	55	18·1
Central	48	28·3
Cheetham	34	15·1
Newton	28	19·0
Crumpsall	14	12·7
Rusholme	14	15·4
Clayton	9	20·7
Moston	5	17·1
Blackley	4	16·6

Estimated in this manner, the greatest amount of overcrowding is to be found in Hulme, then in St. George's and Ancoats, then in Beswick, and after Beswick in Chorlton-upon-Medlock and West Gorton.

If we had regard to these figures alone we should be constrained to admit (1) that there is no overcrowding in Manchester comparable with what occurs in some parts of London, Liverpool, and Glasgow; (2) that the mortality does not at all correspond with the degree of crowding, and that, of consequence, too much has been made of crowding as a factor in the production of a high death-rate.

In the first place, however, these figures do not represent the real degree of crowding at all, not even on area. It is probable, indeed, that the real density of persons per acre is greater in the Central district of Manchester (which has only 48 persons to the acre) than it is in Hulme (which has 151). Still more does this apply to Ancoats. In both the Central and Ancoats districts, so much space is occupied by warehouses, public buildings, factories, and workshops that the real density of persons per acre is altogether concealed, while the inhabitants sustain the additional disadvantage of having their houses overshadowed by tall buildings.

Moreover, in the Central districts there is a particularly disastrous species of crowding, viz., in old, worn out, and badly equipped common lodging-houses.

Further, although the density per acre is not nearly so great in our most crowded districts as it is in the worst parts of London and Glasgow, it does not follow, on that account, that the degree of crowding effective for mischief is much less in some parts of this City.

The inhabitants of Manchester live in two and four roomed cottages, so that a density of 151 per acre necessarily means crowding of persons per room, which is the essentially evil part of overcrowding. It would, indeed, be impossible under modern regulations as regards dwellings, and it only becomes possible by an arrangement of the houses which leaves the air between them stagnant and, with the present arrangement of refuse removal, too often foetid.

It is to be feared that the recent rush of prosperity, and consequent rapid increase of population, has accentuated the degree of crowding in rooms.

The rate of increase, judging from the number of new houses and from the manner in which the houses throughout the City continue to be occupied, cannot be less than 10,000 per annum in 1897 and 1898, as will readily be seen from the following table, which exhibits also the rate of increase in the neighbouring districts, which show a like rapid increase :—

1898.—HOUSES CERTIFIED FIT FOR HABITATION.

Manchester	2,773
Salford.....	1,268
Withington District Council :—	
Withington	171
Didsbury	66
Chorlton-cum-Hardy	152
Burnage	13
	— 402
Gorton District Council	397
Stretford	340
Levenshulme	224
Eccles Corporation	219
Droylsden District Council.....	126
Moss Side.....	119
Failsworth	78
Urmston	88
	—
	<u>Total...6,034</u>

This table should be compared with the figures for previous years given in the Report for 1897.

Although, however, the rate of building appears to be still increasing there are signs that it has now quite overtaken the demand. One comes now and then upon an empty house, where this could not have been found a year ago. It is possible, indeed, that at present there is in the centre of the City, not much more crowding than existed at the time of the 1891 Census.

At that period—as appears from the Census figures which I find abstracted in a most useful report prepared for the Sanitary Committee on Workmen's Cheap Trains and Trams—somewhat over half the houses in Manchester were tenements of less than five rooms, and of these 10 per cent. were overcrowded, the number of persons to a room being 2·6.

This degree of crowding was exceeded in Salford, and having regard to the number of such tenements in Oldham and Stockport, the death-rates in Oldham and Stockport sufficiently show that this is only one cause of the high death-rate.

This is again proved by the death-rate of London, which is much lower than that of Manchester, although the proportion of the inhabitants living in tenements of less than four rooms is greater than in Manchester, while the proportion of such tenements overcrowded was at the Census 22·4 per cent., and the average number of persons in each room of an overcrowded tenement was three.

During the great pressure for accommodation in 1897, the Chairman of the Sanitary Committee instructed the Superintendent of the Sanitary Department to make an investigation of the actual conditions as regards crowding. Mr. Rook accordingly had the circumstances of 1,030 houses in blocks of about 100 each inquired into. These were houses mostly of the poorer sort, situated in Cheetham, Ancoats, Ardwick, St. George's, Chorlton-on-Medlock, and Hulme.

If we may be permitted to assume that the questions asked by the Inspectors as to the number of inmates were truthfully answered—a doubtful factor—the degree of crowding was not such as one would have anticipated.

In estimating the amount of crowding, Mr. Rook assumed that each person should have 500 cubic feet of sleeping room, so that his results are not comparable with those given in the Census.

On this basis, he ascertained that out of 101 two-roomed houses occupied by only one family, 67 were overcrowded.

Assuming that only one room was used as a sleeping room—

Of	8	two-roomed houses occupied by 2 families	8	were overcrowded.
„	79	three-roomed houses occupied by 1 family	12	„
„	6	three-roomed houses occupied by 2 families	4	„
„	480	four-roomed houses with 1 family	56	„
„	155	four-roomed houses with 2 families	31	„
„	7	four-roomed houses with 3 families	7	„
„	86	five-roomed houses with 1 family	12	„
„	26	five-roomed houses with 2 families	1	„
„	5	five-roomed houses with 3 families	3	„
„	43	six-roomed houses with 1 family	4	„
„	24	six-roomed houses with 2 families	3	„
„	4	six-roomed houses with 3 families	2	„

The seven and eight roomed houses not overcrowded.

1,030

210 overcrowded.

The test of crowding here applied is a severe one, and there is no proof given that, if the Census test had been applied to the houses, the proportion of those overcrowded would have been appreciably higher than the average ascertained at the Census.

One thing, however, is clear, viz., that two-roomed houses are habitually overcrowded, and in my opinion the existence of such houses is an incentive to, and a cause of, overcrowding unless a constant pressure is exerted in the opposite direction.

It would be a very great advantage to have an accurate knowledge of the density of tenancy for different portions of the City, such as Glasgow possesses. It is open to question whether the increase of population, and the consequent pressure for house room, has finally resulted in a great increase of crowding, although there is no doubt whatever that we have passed through a period of overcrowding. Certainly the response to the demand for additional houses has been rapidly met. In any case, and from every point of view, it would be an advantage to know the precise facts.

We have seen, then, that the high death-rate of Manchester still awaits explanation. Overcrowding on site and in rooms is a cause for excessive mortality of the first magnitude. Yet such overcrowding is far greater in London, Liverpool, and Glasgow, and we are far behind London as regards our death-rate, while we are only about on a level with Liverpool and Glasgow. The condition of the atmosphere, no doubt, is bad. But so it is in London, Bradford, Oldham, and Birmingham, and so it is not in Liverpool. We have seen that our death-rate cannot be ascribed to the state of the atmosphere.

Equally little can it be ascribed to climate.

It cannot be industrial conditions. These are far more precarious in London than in Manchester, and there is no great amount of pernicious occupations in this City.

There must be some residual and special factors which we have not considered, nor, in my opinion, are these far to seek.

The conditions of collection of domestic refuse form the first special factor in Manchester. The great number of large middens on the outer fringe, in which excreta are stored for months, is an anachronism and a certain cause of disease. It is doubtful whether the pail system, in its present stage, is very much better. Both cause extensive pollution of the soil.

The generally bad state of passage and house drains, adding still further to the pollution of the subsoil, is another evil of the first magnitude—one, however, which is fortunately in process of amendment.

By these combined means, and by the extensive percolation into the soil from collections of horse manure, the subsoil is brought into a high state of impurity.

It is probable that these means are largely instrumental in maintaining the prevalence of typhoid fever, scarlet fever, and diarrhoea, and it is possible that they may be responsible in part for the prevalence of tuberculosis, and of infectious chest diseases, of the etiology of which last we know but little.

A further danger exists in connection with houses which have been erected on tips, the refuse in which has not been completely oxidised.

So polluted a condition of the subsoil as exists in Manchester must cause a serious deterioration and contamination of the atmosphere over all the crowded parts of the City. To this must be added that nearly all the older dwellings in the City are unprovided with damp-proof courses, so that the impure liquids of the subsoil are drawn into the dwellings and render them damp and cold, while serving as a pabulum for the growth of injurious micro-organisms.

It is in this way that the system of cottage dwellings, excellent in itself, becomes a danger to the population, through the want of sufficient precautions to exclude damp and an impure atmosphere.

To remove these injurious conditions we require—

1st—the replacement of the present arrangements for the collection of refuse by good water-closets and covered ash-cans ;

2nd—the reconstruction of defective house and passage drains ;

3rd—the provision in the house yards and passages of a really impermeable surface.

But although the changes mentioned would, I believe, effect a revolution in the health conditions of the City, there would still remain the two difficulties of insanitary areas in the centre of the City, and of the pressure of a growing population.

As regards the former difficulty, it tends to solve itself in one sense by the increasing demand for warehouse accommodation, and by the improvements required in the interests both of traffic and of public educational and other requirements. As the City grows larger, the more central portions of insanitary areas tend to disappear. It is necessary to hold this tendency in view in dealing with insanitary areas with a view to reconstruction. Such reconstruction must concern itself with the accommodation required for the class of persons living in common lodging-houses, which is bad in the extreme, and with the housing of the poorer labourers, who must live near their work, and must yet have houses of their own. It should be possible to provide for the former in buildings situated near the centre of the City, and for the latter at no great distance. In both cases difficult readjustments will have to be made. The point which it is necessary to keep in view is that such reconstructions should not be too near the centre.

A second point is that the accommodation provided requires to be widely different in character from that now prevailing, especially as regards common lodging-houses.

The third point which requires emphasizing is that if the people in process of displacement near the centre are to be rehoused in situations equally favourable, it will be impossible to make provision for them except in block

buildings. In the recent reconstructions, preference has been exhibited for the cottage type of dwelling preferred by Lancashire people. This is only possible, however, by diminishing the number to be accommodated on a given area, which again means, if overcrowding is to be avoided, migration to the newer houses in process of erection on the outer portions of the City. This solution of the question, so far as I can see, ought to be heartily welcomed, but it entails a great extension of the facility of transit to and from the centre of the City. The Chairman of the Sanitary Committee, from an early period, perceived the necessity of directing the energy of the Committee to this problem, as being one vital to the development now taking place.

The directions in which he considers that progress is required are two, viz. : in getting cheaper fares and more convenient trains for workmen travelling by trains to and from their work, and in the development of the tramway system by a careful mapping out of extended tram routes to be constructed, and a rearrangement of the running of trams, so as to give the utmost facility of communication between the different parts of the City, as well as between the City and outlying districts.

He considers, I believe, that even more is to be hoped for from convenient tram arrangements than from the railways. In these views I quite agree. But it is evident that in giving practical effect to them there will require to be a concurrence of opinion and effort on the part of the members of the City Council, and that much forethought will require to be exercised in planning out the extensions and connections required in the tram routes before the trams are taken over by the Corporation.

It was mentioned in the Report for 1897 that the pressure for houses had had the effect of arresting the action of the Committee in dealing with unhealthy dwellings, and more particularly with back-to-back dwellings. In fact, quite an agitation arose on the subject at the time of the elections. It was represented that to turn people out of their homes when they could get no other houses to go to was not only a great hardship, but by inducing overcrowding was calculated to defeat the purpose of the Sanitary Committee. Were such an argument, however, valid to stay the closing of houses, any improvement in the housing of the people would be rendered impossible, except by increase of houses. As the Chairman of the Sanitary Committee pointed out, the displacement of tenants who paid irregularly or not at all would become under the circumstances a certainty ; and though the operation of the Sanitary Committee add to the inconvenience and hardship of persons displaced for a time, they are not the principal cause of the inconvenience and hardship. The condemnation and opening out of back-to-back dwellings in different districts by no means entails the same disturbance as clearing an area for reconstruction, an area which is tolerably certain not to be reinhabited by the same persons.

On the other hand, this is a partial and imperfect procedure compared with the clearance and reconstruction of an area. This must be at once admitted, although it is a most beneficial procedure where from any cause it is not possible to clear an area of sufficient size for reconstruction, and it is to be hoped that where there is no prospect of altogether sweeping away back-to-back houses within a reasonable time they will be condemned, and, where possible, converted into through houses, with good yards and suitable closets. The very rapid increase of houses should greatly remove the objections entertained to this work, while imposing on the Corporation the duty of straining every nerve to provide cheap, convenient, and punctual conveyance from the outskirts to the workshops.

In connection with the reconstruction of areas, the question arises whether economically this is a justifiable procedure when carried out at the expense of the rates. Much private effort in this direction has been manifested in London, Glasgow, and Liverpool, but in Manchester very little. This fact may be taken as sufficient evidence that under the conditions attending the sale of land in Manchester such reconstructions are not considered to pay.

Indeed we are informed by Mr. Costelloe that the building operations of the London County Council have been a source of expense to the community. The same is true so far in Manchester.

This has been regarded by some as sufficient ground for condemning schemes for the rehousing of the people on insanitary areas. It has been suggested that in this way the independence of the people is sapped, while an unfair competition with private builders is set up. I cannot see the matter in this light. On the other hand, it may be doubted how far it is necessary to rehouse the displaced tenants on the same area.

But, granting that it were necessary, the rehousing of the people in healthy dwellings, to some extent at all events at the public expense, would appear to stand much in the same position as building fever hospitals for the reception of patients who might be treated at home at the risk of the neighbourhood. In the same manner, worn-out and unhealthy dwellings might be retained at the risk arising to the neighbourhood of consumption, enteric fever, and other infectious diseases being propagated in them, and thence scattered broadcast.

Pauperisation can only ensue when the individual realises that he is getting a grant in aid, which the inhabitants of the new dwellings do not. In the case of the fever hospital, there is no pauperisation, because the citizen is told, "you shall send your child to the hospital in order to protect your neighbours from infection." So, when you compel people to leave their insanitary dwellings for the sake of the community, and offer them better dwellings on favourable terms, there is no pauperisation. There is, moreover, an

obligation on the community, in so far as by sanctioning building arrangements in the past, which are now regarded as inimical to health, they have placed poor people under conditions of habitation such as they would not otherwise have been under. The community ought, therefore, to bear part of the burden arising from these conditions.

How far is it possible to carry out schemes of reconstruction near the centres of large towns without entailing expense on the community under the existing prices of land in Manchester? It is difficult to see how this can be done.

Nevertheless, the cottages, tenements, and common lodging-house now in process of erection at Oldham Road, Pott Street, Chester Street, and Harrison Street are so planned as to show a return exceeding the interest on the money expended in acquiring and clearing the areas.

It is a difficult matter to arrive at clear ideas on the question whether it is possible to acquire insanitary areas, pull down the old structures, and erect on the vacant land properly sanitary dwellings which will pay their way. The Corporation of Glasgow have published an abstract statement and balance sheet for the years 1897-98 relating to operations carried on under the Glasgow Improvement Acts 1866 to 1895.

These operations relate to a number of tenement blocks, a family home, no fewer than seven common lodging-houses, and a laundry, and show a balance of revenue over expenditure for the year ending 31st May, 1898, of £3,105 16s. 6d.

The net expenditure for the year, including interest on loans amounting to £33,973 8s. 6d., was £60,349 15s. 10d.

How far it is desirable to make such results a primary consideration is open to doubt.

BAKEHOUSES.

During the year 1898, 35 bakehouses have been dealt with, of which 17 have been closed and 18 have been altered. It will be seen that this is a much smaller number than have been dealt with in recent years.

It cannot be said, although a fair amount has been accomplished in diminishing the number of the worst class of cellar bakehouses, that there is not left plenty to do, and it would be a pity if this work should be allowed to fall off.

The total number of bakehouses dealt with in each year, of which particulars will be found in the Annual Reports 1894-1897, has been: 1894, improved 3, closed 3; 1895, improved 16, closed 12; 1896, improved 28, closed 18; 1897, improved 22, closed 31; 1898, improved 18, closed 17; total, improved 87, closed 81 = 168.

The following list gives particulars of bakehouses altered and closed during the year 1898:—

BAKEHOUSES DEALT WITH DURING THE LATTER PART OF 1898.
BAKEHOUSES CLOSED.

Address	Date
52, Rochdale Road.....	November 9th, 1898
66, Shudehill.....	October 5th, 1898
560, Rochdale Road.....	November 21st, 1898
47, Blackfriars Street.....	July 19th, 1898
1, Clough Street.....	September 3rd, 1898
99, Rochdale Road.....	November 21st, 1898
51, Clayton Street.....	December 27th, 1898

BAKEHOUSES ALTERED IN THE LATTER PART OF 1898.

Address	Name	Date
128, Stretford Road...	James Fielding	October 8, 1898
48, Russell Street	— Buck	October 27, 1898
2, Elizabeth Street ...	J. N. Benson	September 27, 1898
49, Clayton Street.....	Ellen Frear	November 12, 1898
90, Mosley Street	Messrs. Greaves & Holtkamp	December 24, 1898
229, Chester Road ...	...	June 17, 1898
22, Bury New Road ...	A. Silvertan.....	July 26, 1898
181, Mill Street.....	J. Woodhouse & Son	December 28, 1898
100, Radnor Street ...	Thos. Owen.....	December 22, 1898

The total number of bakehouses on the Register is 514. Of these, 207 are cellar bakehouses, that is to say, the greater part of the walls are under the level of adjoining ground, so that they are accessible to damp.

The number of bakehouses reported to the Medical Officer of Health as requiring his attention is 53.

It will be seen, therefore, that the majority of these cellars have been dealt with in such a manner as to render them free from damp and more easily cleaned, or else they have been closed by the owner.

Attention was first pointedly called to the condition of these bakehouses by Dr. Waldo and Dr. Walsh. Proceedings were taken in Manchester shortly after the proceedings instituted by Dr. Waldo.

Dr. Waldo declined to specify any improvement in bad cases, and, though a Medical Officer of Health has no power to close cellar bakehouses, such an attitude, if sustained by the Magistrates, is equivalent to a closing order.

The objections taken to these places have been fully set forth by Dr. Waldo and Dr. Walsh, and also in the Manchester Annual Reports. However, I suppose, we have an unexampled experience in dealing with them, and it is, perhaps, advisable to recapitulate the conditions which are considered to render them insanitary.

They are, for the most part, simply house cellars, such as might be used for washing purposes, but have been not infrequently insufficiently floored for that object.

Referring, now, only to those which the Medical Officer of Health is still called upon to deal with, not a few of them have had connections with the sewers, and the drainage when taken up has been found to be defective. This, of course, is against the statute, and very few indeed of such connections can now remain in the Manchester bakehouses.

As a rule the floor is flagged, but often imperfectly, so that the bakehouse has access to the ground air, and dirt lodges in the cracks, as well as on the flags. Indeed it is no easy matter, even when the floor presents an unbroken cement surface, to keep the floor as clean as it should be.

The walls are generally rough and damp, so that not only does dirt lodge in the crevices, but a fur of damp and decomposing flour forms on the walls, particularly in those situations, such as behind proving troughs and tables, to which the baker can with difficulty get access. Frequently, also, all sorts of litter is allowed to accumulate under the tables.

In every well-appointed bakehouse, therefore, the furniture should be supported on strong ball-bearing castors, so that it may be easily moved about by the baker, to enable him to clean all parts of the bakehouse. Articles of clothing, much more boots, should not be allowed to lie about in the bakehouse, nor in any unventilated cupboard communicating freely with the bakehouse.

Most frequently the ceiling has consisted of bare beams and floor boards. This is particularly objectionable, as there are frequently cracks in the boards, and sometimes many and large gaps, which let dirt through from the room above. This room is generally the shop, in which case, of course, the amount of dirt passing through will be considerable.

With insignificant exceptions, the front wall rests against the ground and the ceiling level is not much above or below the level of the adjoining street. The areas formed to admit light do not reach much below the bottom of the window, and are moreover very narrow, so that in general the bakehouses are dark, and artificial lights—that is to say, two or three gas jets—are often required during daylight. Where such light is not needed during the day, the light is often insufficient to show whether the bakehouse is throughout kept in a cleanly condition.

The temperature of the bakehouse requires in summer that there should be free access of air, and the result is that, in dry and windy weather, street dirt is blown in at the window, and the atmosphere is injurious to the workmen.

The oven often forms part of the bakehouse, and in all cases the mouth of the oven opens into the bakehouse. The means not existing for free perflation of air, or for an adequate movement of air in other ways, the atmosphere becomes very close and warm. To this may be added that, the ovens being of the waggon type, the fuel used in heating the oven is drawn out into the bakehouse two or three times a night, and gives off carbonic acid and sulphurous acid freely as well as some carbon monoxide, while adding to the already high temperature. An exacerbation of the temperature occurs, of course, when the bread is drawn and as it cools.

The temperature of the cellar bakehouse probably averages from 75° F. to 85° F. during the hours of work. On two occasions, when special examinations were made of the temperature of two bakehouses at night, owing to complaint of excessive temperature and disagreeable odours in adjoining houses, the temperatures in the bakehouses were found to be at the time of examination 90° F. and 93° F. respectively.

I do not think there are now any closets in direct connection with bakehouses in Manchester, and indeed, they were not numerous when these operations commenced in 1894. It is not surprising, however, that closets should have been provided in the bakehouses, since it was then a not unusual practice to lock the bakers up during the hours of work, a disgusting state of things, which left the men no option in certain states of health but to use part of the bakehouse as a privy. The Inspectors inform me that this no longer goes on, and it is to be hoped that it does not. But seeing that it could only occur through mistrust either of the steadiness or of the probity of the employes, the temptation to it must be of the same strength as before.

These were not, however, the only objectionable uses to which the bake-houses were put. Another was their employment as wash-houses. After that just mentioned, this was the most objectionable. If we are to accept the bacteriological investigations of Dr. Waldo and Dr. Walsh, it is a use fraught with danger of infection being carried through the bread, whether by crust or crumb matters but little. We believe that this practice has also ceased.

Another objectionable custom, however, is the use of the bakehouse as a sleeping apartment. The baker, fatigued with his long hours of work, makes up his batch, puts the lid on the proving trough, covers it with a few bags, and composes himself for a sleep while the dough is rising, or occasionally he obliges a belated mate with the same convenience. It is difficult to see, however, how this adds much to the essential insanitary condition of the unduly long hours which bakers notoriously work or rather spend in the bakehouse. At the same time, as bearing on the question of long hours, the practice appears to be contrary to the statutory requirement that there shall be no sleeping room on the same level, unless it is completely separated from the bakehouse.

The bakehouse itself, however, may be rendered clean and, except perhaps for ventilation, satisfactory in its sanitary condition, and still remain in connection with other dark, dirty, and damp underground recesses used perhaps for washing, perhaps for a flour store, perhaps for a coal store, or even occasionally for temporary storage of bread. In one such place was found some years ago a batch of bread, part of which was damp through contact with a damp and filthy wall.

Any improvements to be satisfactory must extend to such connected recesses.

It is, as Dr. Waldo suggests, impossible to believe that bakers do not suffer in their health from such conditions as those mentioned. Cooped up perhaps for 14 hours in a hot atmosphere, exposed to dust from the streets and to the abundant dust deposited from the shop, inhaling an atmosphere charged with carbonic acid from the processes of baking, from gas jets, from the breath, and from the adjoining soil, they are bound to suffer from lung disease and from anæmia. It is not much wonder that many of them drink to excess, or that they are specially prone to suicide. They do not appear to suffer in an excessive degree from phthisis.

It would appear, however, from the Supplement to the 55th Report of the Registrar-General that there has been a great improvement in the health of bakers in recent years so far as deaths traceable to alcohol are concerned. This is probably due in great measure to shorter hours and to better sanitary conditions. That improvement, I feel sure, does not apply to such conditions

as have been named in connection with the worst class of cellar bakehouses. Indeed it may be doubted whether in regard of these bakehouses matters have not been made worse, since the best workmen will go where they have shorter hours and good sanitary conditions.

Dr. Tatham also states that the mortality from respiratory disease other than phthisis is below that from occupied males generally.

It has been stated that journeymen bakers often change their occupation, their place being taken by recruits from the country, and I do not think there is much doubt that in the class described as bakers the proportion of those who do not personally work in the bakehouse is a very high one. I have very rarely seen a working baker above 45, and they are mostly young people.

Of course those who are described as bakers, but who do not actually bake, sell the bread, and so are workers.

I feel sure there is some fallacy about the figures of the Registrar-General, as it is to me inconceivable that persons should work under the conditions of the journeyman baker in cellar bakehouses and yet not sustain an excessive mortality, or else there are great disparities in the health enjoyed by bakers. Thus a quotation was given in the Annual Report for 1894 from the records of the Amalgamated Union of Operative Bakers and Confectioners, of which only 5 per cent. are confectioners, containing figures which go to show that the actual operative does suffer excessively from bronchitis and pneumonia.

Then again, owing to the great strain imposed upon them in carrying sacks of flour weighing 280lbs., bakers are known to suffer excessively from rupture, as well as from flat foot. Fortunately, the remarkable tenacity with which the custom of buying sacks of this size was maintained has now given way to a more humane spirit, and many bakers use sacks containing 140lbs. This growing custom, however, is only recent, and we should, therefore, expect that bakers would be found to suffer in excess from diseases of the circulation. On referring to Table IX., however, of the Supplement referred to, we find that the mortality from diseases of the circulatory system is below that of all males, which goes to strengthen the impression that some such fallacies as I have mentioned impair the value of the figures as applied to this class of worker.

On the other hand, while I feel certain that many of the cellar bakehouses in Manchester exert a disastrous effect on the health of the bakers, and while I agree with Dr. Waldo that many of the journeymen bakers bear the stamp of an exhausting occupation, this is, I think, not so general as to be stated as a characteristic. Still, in effect, as carried on in these bakehouses, I have received the impression that the work as a whole is very unwholesome.

At this stage of our progress a short résumé of the history of our procedure may be useful.

When in 1894 the Sanitary Committee determined to deal with the subject of bakehouses, the Association of Master Bakers in this City were greatly perturbed, and waited upon the Committee. After the subject had been fully discussed, however, they felt more in unison with the Committee, and their subsequent deliberations led them to the view that a period ought to be put to the existence of cellar bakehouses. At that time there seemed some prospect of general legislation on the matter. Five years have now elapsed, and, in spite of the plain statement of the condition of cellar bakehouses made by Dr. Waldo and others, no step in this direction has yet been made.

The adoption by the Association of this view was, nevertheless, of great assistance to the Sanitary Committee, and the work was proceeded with in a much more active spirit than would otherwise in all probability have been shown.

At first the Medical Officer of Health visited the bakehouses, and defined his requirements, which were not so complete as a little experience enabled him to make them. In a short time it became evident that, to prevent misunderstandings and save time, it was desirable that a full and technical specification should be prepared for each case, and several such specifications were prepared by Mr. Lynde and other Sanitary Engineers on the basis of the requirements of the Health Department. It soon became evident, however, that some bakers would employ people of their own choosing to prepare specifications, which caused more work than they saved, and in the end were unsatisfactory.

Accordingly, on the suggestion of the Chairman of the Sanitary Committee, the work of preparing specifications was entrusted to one of the City Surveyor's staff, by whom a form of specification was drafted on lines laid down by the Medical Officer of Health. This form has already been given in the Annual Report for 1895.

The technical details will not be here repeated. But the essential features of the specification may be given :—

1. The floor of the bakehouse to be rendered impermeable to damp, and as far as possible free from inequalities.
2. The walls to be made even and free from damp. It was soon found that this could only be effected by building an internal wall against the damp portion, with a cavity between ventilated to the outer air.
3. The windows to be so arranged as to give additional light, and so as not to admit dust from the street. For this purpose it was necessary that they should be made not to open, except in positions from which dirt would not be blown in.

4. To make up for the loss of ventilation thus sustained, special ventilating tubes and shafts or openings are required, so arranged as to supply the air necessary for respiration and combustion, and to give to it the requisite movement.

Each separate case requires its own special means. Generally, however, it may be said that what has been aimed at is to bring the cold air in by inverted Tobins, and to take the warm air out by means of tubes with collecting mouths, connected with a vertical shaft, surmounted by a ventilating cowl. The ventilation is aided by a Bunsen jet or a gas jet in the collecting mouth. This arrangement answers well in winter, but has sometimes appeared insufficient for summer.

5. The ceilings to be made smooth, and impervious to dust.

6. Where requisite, the floors to be lowered, so that ventilation may be rendered possible.

7. With one exception, all drain connections have been removed from the cellars.

8. The furniture to be fitted with strong ball-bearing castors, so as to be easily moved for purposes of cleaning.

9. Adjoining cellars to be freed from sources of pollution, and from damp.

10. All connections with closets to be removed, and suitable conveniences provided outside. The bakehouse to be as completely separated as possible from adjoining cellars.

In order to carry out these requirements extensive alterations have in some cases had to be made, such as removing internal walls and providing iron beams and supports.

The result in those cases in which alterations have been carried out has in general been to leave the bakers highly satisfied. In one respect—an essential one—the improvement has, in summer, often not been appreciable, viz., in ventilation. This is a difficulty not easily met, and altogether it may be said that, even as regards ventilation, a great improvement has been effected.

To Mr. Story, and Mr. Lawson his predecessor, I owe an acknowledgment of the manner in which this work has been carried out.

These improvements of cellar bakehouses have always been understood to be of a temporary character, and, with most recent specifications, it has been stated that the acceptance and carrying out of the specification is not to tie the hands of the Corporation except for a time. What we have looked forward to is the fixing of a period after which the prolonged immuring of

working bakers in cellars, exposed to an excessive heat, and with imperfect means of ventilation, should cease. The period originally named in 1894 was ten years, and this seems a reasonable period under altered conditions, starting with 1899.

It may be supposed that the closing of 81 bakehouses has had a considerable effect as regards the provision of convenient places for baking, and it is therefore necessary to follow the result with some degree of watchfulness. The effect has been twofold. In part, new and larger bakehouses have been provided, whilst doubtless the demand on the larger bakehouses has increased, and partly there has been a tendency towards baking bread, for sale, in kitchens and sculleries on a scale still smaller than that prevailing in cellar bakehouses. It is customary in a very large proportion of Lancashire households of the artisan and better-off classes to bake the bread at home, and the smaller business which has arisen is of this order. At the same time this does not appear to have occurred on a scale sufficient to constitute an effective counterpoise to the bakehouses closed. On several occasions these small bakeries have been so arranged that the oven adjoins an external pail-closet, a condition which is offensive. This is easily remedied by substituting a water-closet for the pail, and no difficulty has been experienced, with one or two exceptions, in getting these small bakeries made satisfactory from a sanitary point of view. They should, however, be discouraged, since not only do they render the kitchen unpleasantly hot, but if they should be transferred to a family containing several young children, there is danger of infectious disease being conveyed by the bread.

In effect, the tendency has been to throw the baking of bread more into the hands of those bakers who have a large business, and keep their bakehouses in decent condition.

A list of new bakehouses has been furnished year by year. Those opened in 1898 were :—

Albert Street and Carmen Street, Ardwick.

Brunswick Street and Heywood Street, Cheetham.

Windsor Road and Osborne Road, Harpurhey.

Hamilton Road and Clitheroe Street, Rusholme.

Moston Lane and Upper Conran Street, Moston.

17, Carter Street, Chorlton-on-Medlock.

Speaking generally, the new bakehouses have consisted of a large baking room on the ground level, with a flour store above. In one or two instances a flour store, a bread room, and a baking room have been provided.

The bakeroom, needless to say, has cement concrete floors, smooth walls, coved smooth ceilings, and furniture on castors. The ovens are generally of

the flue or other improved kinds, the fires being outside the bakehouse. Ample light and ventilation are provided. Ventilating flues are built alongside of the furnace flues. A water-closet is provided in the adjoining yard, and a lavatory, which is put as convenient as possible for the water-closet, so that the bakers may wash their hands before returning to their work. No stable is permitted to be within 16 feet of the bakehouse, and the arrangements for collecting and removing manure are such as to reduce effluvia from that source to a minimum.

The flour stores are provided with abundant ventilation. The chief fault which I have to find in respect of the new bakehouses is that they are often lined with glazed brick, and that these are mortared in such a way as to leave gaps between the bricks where dirt can lodge. In fact expense is spared, or at all events the workmanship is bad, just where it should be most carefully carried out.

On the other hand, the new bakehouses are thoroughly dry and well ventilated.

The economic aspect of these changes needs some consideration. There can be no possible hesitation as to the amelioration in the lot of the journeyman baker from the baking business passing into the hands of the larger concerns. But is there not a distinct loss in the withdrawal of opportunities from small people to establish a good business? Are we not losing something in the way of enterprise?

So far as we have yet gone, nothing of this kind could have resulted. For the most part the places closed are too small to permit of a business being carried on which would yield a substantial profit. If, however, nearly all cellar bakehouses were closed, would not such a crippling of enterprise ensue?

To some extent, no doubt, this would happen, though not, I think, to such an extent as to outweigh the manifest advantages of the change. Nearly all the bakehouses recently erected in Manchester have been built by bakers who have been displaced, and I do not know of a single instance in which the change has been matter for regret. Apart from the fact that an enterprising and steady baker can generally find the means to erect a new bakehouse, the larger concerns will furnish opportunities for the successful type of man to rise to the top, and to obtain the means of starting on his own account. Allowing, however, for a certain degree of repression of individuality, this cannot be allowed to weigh against the improvement in health of the journeyman bakers, as well as in their hours of work, and in the cleanliness and safety of the bread turned out. Not only so, but each new man who is able to start himself does so imbued with a sense of the absolute necessity of cleanliness, light, and fresh air in the bakehouse, and of rigorous care in the making of the dough and in the storing of the bread.

It may be assumed that none of the cellar bakehouses, except, perhaps, some of those improved under our recent procedure, can be said to fulfil sanitary conditions, and these are not satisfactory as regards temperature and ventilation. As has been already mentioned, it is not contemplated by the alterations prescribed and carried out to give the improved cellar bakehouses a long tenure of existence, and I am strongly of opinion that the time has come when a period should be put to the existence of cellar bakehouses. This can only be done by general legislation, and legislation might follow some such lines as these.

(1) *Definition*.—Under the term “cellar” or “underground bakehouse” is included every place used for the baking of bread or confectionery for sale having more than four feet of its height, measured from any part of the floor in contact with or below the level of the ground immediately adjoining, unless the ground which it adjoins is separated from the wall of the bakehouse by an area at least three feet in width, the floor of which is at least one foot below the level of the floor of the bakehouse immediately adjoining.

(2) On and after January 1st, 1910, cellar bakehouses shall cease to be used for the purpose of baking bread or confectionery for sale.

(3) Except that a prolongation of use not exceeding five years may be granted in respect of any cellar bakehouse on the certificate of the Medical Officer of Health to be given within one year of the passing of the Act.

(4) No such prolongation of term shall be granted, however, in respect of any cellar bakehouse which fails to fulfil the following conditions at the passing of the Act :—

(a) The cellar to be not less than 8 feet in height throughout.

(b) All statutory requirements to be fulfilled.

(c) The bakehouse to be completely and effectually separated from any insufficiently lighted or insufficiently ventilated or damp cellarage.

(d) The ventilation of the bakehouse to be such that the amount of carbonic acid in the atmosphere of the bakehouse while work is going on shall not exceed 1 per 1,000 by volume, such determination not to be made directly after the wagon is withdrawn.

The temperature of the bakehouse, except for an hour after the drawing of a batch of bread, not to exceed 85° Fahr.

Observations of temperature made before the passing of this Act to be considered sufficient proof of unfitness, unless it is satisfactorily shown that the conditions are structurally so changed as to remove deficiencies.

The arrangements for ventilation to be in all respects satisfactory to the Medical Officer of Health,

(e) The floors and walls of the cellar to be impermeable to damp.

(f) The floor, walls, and ceiling to be smooth and even throughout, and the ceiling to be impervious to dust.

(g) The flour store to fulfil the same conditions as the bakehouse.

(h) Access to be provided to a water-closet outside the bakehouse and connected rooms.

(i) The entrances into the bakehouse to be clean, well lighted, and not such as to lead to the admission of dust into the bakehouse.

(j) The bakehouse to be efficiently lighted by daylight in such a manner as not to admit dirt.

(k) The tables and proving troughs to be provided with strong ball-bearing castors.

(l) The space for each workman to be not less than 500 cubic feet.

(5) This Act shall not be construed as preventing the Medical Officer of Health from undertaking any proceedings which may be called for by Section 16 of the Factory and Workshops Act.

Nor shall the removal of the exceptions mentioned in Section 5 create any obligation on the Medical Officer of Health to extend the period within which a bakehouse must be closed, if, in his opinion, a bakehouse so altered cannot be rendered healthy.

In the absence of some such provisions there is a constant tendency to reaction in respect of cellar bakehouses, and it is submitted that the period provided for their extinction is sufficiently long.

These are only to be regarded as containing the gist of the matter, and not as the complete shape in which such proposals would appear.

COMMON LODGING-HOUSES.

There are in this City 206 Common Lodging-houses which are under the supervision of the Police.

The number of persons inhabiting them was found to be approximately 5,831, giving an average of 28 per house.

They are situated chiefly in the Manchester Township, though there is a thin fringe on the adjoining parts of Cheetham, Ardwick, Chorlton-upon-Medlock, and Hulme.

OCCUPATIONS OF PERSONS LIVING IN COMMON LODGING-HOUSES.

The occupations of persons inhabiting them is shown in the following return, which the Chief Constable was good enough to arrange and obtain for me:—

	<i>Divisions.</i>								Total.
	A.		B.		C.		D.		
Hawkers.....	499	...	19	...	74	...	44	...	636
Tramps	417	...	7	...	7	...	10	...	441
Organ Grinders	23	...	0	...	0	...	1	...	24
Bill Posters.....	16	...	0	...	2	...	12	...	30
Flower Sellers.....	104	...	1	...	16	...	1	...	122
Toy Sellers.....	62	...	0	...	1	...	4	...	67
News Vendors	108	...	3	...	5	...	32	...	148
Railway Porters	73	...	6	...	29	...	47	...	155
Hotel Porters.....	73	...	9	...	14	...	25	...	121
Labourers	1261	...	155	...	242	...	261	...	1919
Blacksmiths	27	...	2	...	19	...	11	...	59
Gas Stokers	49	...	1	...	17	...	3	...	70
Carters	110	...	14	...	27	...	27	...	178
Joiners	71	...	8	...	12	...	9	...	100
Bakers.....	36	...	3	...	5	...	8	...	52
Butchers	61	...	3	...	9	...	14	...	87
Tailors	77	...	5	...	13	...	22	...	117
Shoemakers	151	...	6	...	15	...	24	...	196
Stableman	92	...	10	...	14	...	35	...	151
Cabmen.....	19	...	0	...	3	...	17	...	39
Tram Drivers	2	...	0	...	0	...	0	...	2
Mechanics	103	...	5	...	24	...	30	...	162
Clerks	41	...	3	...	6	...	40	...	90
Millhands	52	...	0	...	12	...	4	...	68
Market Porters.....	25	...	0	...	0	...	0	...	25
Washerwomen.....	53	...	0	...	4	...	0	...	57
Machinists	4	...	0	...	3	...	0	...	7
Mason.....	0	...	0	...	1	...	0	...	1
Cooper.....	0	...	0	...	1	...	0	...	1
Polishers	2	...	0	...	1	...	0	...	3
Upholsterers	1	...	0	...	1	...	0	...	2
Saddlers	0	...	0	...	2	...	0	...	2
Painters	6	...	4	...	1	...	6	...	17
Bricklayers	1	...	6	...	2	...	0	...	9
Plumbers.....	1	...	0	...	0	...	2	...	3

OCCUPATIONS OF PERSONS LIVING IN COMMON LODGING-HOUSES—*continued.*

	<i>Divisions</i>									
	A.		B.		C.		D.		Total.	
Cloth Carriers.....	0	...	0	...	0	...	5	...	5	
Time Keepers	0	...	0	...	0	...	1	...	1	
Window Cleaners	1	...	0	...	0	...	1	...	2	
Travellers	0	...	0	...	0	...	3	...	3	
Seaman.....	0	...	0	...	0	...	1	...	1	
Warehousemen	12	...	0	...	0	...	13	...	25	
Hairdressers	3	...	1	...	0	...	1	...	5	
Grocers' Assistants.....	0	...	2	...	0	...	4	...	6	
Slaters.....	0	...	1	...	0	...	1	...	2	
Drapers.....	0	...	3	...	0	...	1	...	4	
Wood Carver	0	...	1	...	0	...	0	...	1	
Racing Touts.....	0	...	2	...	0	...	0	...	2	
Compositor and Printers ...	2	...	1	...	0	...	0	...	3	
Sugar Boiler	0	...	1	...	0	...	0	...	1	
Brush Makers	0	...	2	...	0	...	0	...	2	
Bookbinder	0	...	1	...	0	...	0	...	1	
Dyer	0	...	1	...	0	...	0	...	1	
Drover	0	...	1	...	0	...	0	...	1	
No occupation {	Males	185	...	3	...	2	...	43	...	233
	Females ...	326	...	0	...	44	...	1	...	371
<hr/>										
All Trades ...	4149	...	290	...	628	...	764	...	5831	

The condition of these Common Lodging-houses can only be described as bad.

Inspector Bruford has prepared for me a detailed statement of the conditions of each of these houses, with attached plan. In most of them the faults are too numerous for a summary of this description.

A full statement will be given in a special report. It may, in the meantime, suffice to state that they are for the most part defective as regards day-room and in respect of personal cleanliness, and that they are frequently deficient in respect of closet accommodation, ventilation, cleanliness, structure, and yard space. Their effect on the health of the inmates is, and must be, disastrous. Many of them are, in my opinion, unfit for the purpose to which they are put.

In respect of new Common Lodging-houses, indeed, the Chief Constable refers each application to the Medical Officer of Health, and practically always extensive alterations are made before they are put on the register. Such alterations, however, do not place these houses nearly on a level with the excellent Common Lodging-house which the Corporation have erected, and which, it may be hoped, will serve as a model for others in positions where they are very much needed.

WORK OF THE LADIES' HEALTH SOCIETY.

WORK OF THE LADIES' SOCIETY FOR VISITING THE JEWISH POOR.

A descriptive account of the work of these Societies appeared in my Annual Report for 1897. It will, therefore, be unnecessary to go much into detail. The Societies, during the latter half of the year, continued their beneficent work with renewed vigour. The Sanitary Committee decided to pay the wages of nine Female Health Visitors instead of six, and at the same time expressed the opinion that more detailed reports of their work should be given in the Quarterly Health Return of the Medical Officer of Health. I thereupon revised the daily report form, and at the commencement of July the Female Health Visitors set to work on a complete survey of their respective districts. Later, the Committee agreed to pay the wages of a Jewish Visitor for special duty in the Strangeways District. The wages of the Visitors have since been increased from 14s. to 16s. per week.

The tables which appear in the successive Quarterly Health Returns now give a fuller account of the work performed by the Female Health Visitors, under the direction of their respective Lady Superintendents.

The community are under a debt of gratitude to the Ladies of the Health Societies, who bring sympathy, knowledge, and counsel to the homes of the poor, while they materially aid the efforts of the Sanitary Authority by inducing and helping poor people to practise an enlightened cleanliness.

Moreover, the record of the sanitary work done by the Society, which appears in summary in the Manchester Quarterly Reports, shows also much valuable work as the direct result of inspection by the Health Visitors.

MONSALL FEVER HOSPITAL.

REPORT FOR THE YEAR 1898. BY DR. R. W. MARSDEN.

The latter part of 1897 was remarkable for the extreme prevalence of scarlet fever, but at the beginning of 1898 there were already signs of a diminution, and this diminution was maintained throughout the year, so that the total number of cases of this disease admitted was less than in any previous year since 1891.

On the contrary, the cases of diphtheria were slightly more numerous, though this increase was chiefly limited to the months of September and December, when 18 and 14 patients respectively were admitted during these two months suffering from this disease.

Enteric fever, however, beginning to rise in August, quickly assumed unusual proportions, taxing the hospital accommodation for this fever to the utmost, so that not only did the total number of cases admitted exceed those of the previous year by 126, but they constituted a record year so far in this disease.

In connection with enteric fever, it is gratifying to be able to report the successful treatment by operation of one case of perforation of the bowel. The operation was performed five times, and though only one successful result can be recorded, yet this offers hope for further success in this most fatal complication.

Owing to the scarcity of cases of scarlet fever, which always forms the greatest bulk of the patients, the total number of cases admitted during the year was only 1,509, and a glance at the table giving the monthly distribution of the various fevers shows the steady fall in the number of patients in hospital from this cause; and the increase which is noted during the last four months is due to the prevalence of enteric fever already mentioned.

It will further be seen that the mortality on all cases has, during the past year, been distinctly in excess of the average; but this is again readily accounted for by the relatively small number of scarlet fever patients, in which disease the mortality is usually very low, viz., 6·7 for 1898, and the relatively large number of enteric fever patients, in which disease the mortality is always very considerable, viz., 16·1 for 1898. A table is included showing the mortality of these two diseases for the past ten years.

I am pleased to be able to report, as before, that the health of the staff during 1898 has been good. Of the various infectious fevers, six nurses and two laundry-maids contracted scarlet fever, eight nurses and one ward-maid contracted enteric fever, and one nurse and one ward-maid suffered from measles, though the latter was most certainly not contracted in the hospital. Fortunately, all recovered.

Of general ailments unconnected specially with residence in a fever hospital they have with one exception been of a mild character. The exception referred to was an attack of acute meningo-myelitis in one of the sisters, and unfortunately it terminated fatally in about a month from the time of onset.

The clinical instruction in infectious fevers to the students of the Owens College, and the lectures to the nurses of the hospital, have been conducted as before.

REPORT FOR THE YEAR 1898.

Remaining in Hospital 1st January, 1898	443
Patients Admitted during 1898	1509
	<hr/>
	1952

Discharged.

Cured and Died.....	1719
Remaining in Hospital 31st December, 1898..	233
	<hr/>
	1952

Total Number of Deaths during 1898.....	162
Net Mortality	10·7%.

If the 443 cases of 1st January, 1898, be included, the mortality would be 8·2 per cent.

Of deaths, 17 occurred within 48 hours of admission (6 male and 11 female).

Daily Averages.

Patients	254·6
Nurses and Servants	127·32
Officers.....	6·59
Daily average stay, in days.....	53·04

SHOWING MONTHLY DISTRIBUTION OF PRINCIPAL DISEASES THROUGHOUT THE YEAR.

1898	Scarlet Fever	Enteric Fever	Diphtheria	Morbilli	Erysipelas	Pneumonia	Unclassified	Total	Daily Average Number of Patients in Hospital
January ...	124	43	3	...	1	1	...	172	434·8
February..	99	38	7	1	1	...	6	152	364·1
March ...	115	33	1	3	5	..	6	163	307·9
April	63	19	2	6	2	2	6	100	281·8
May	80	20	4	...	2	1	11	118	239·1
June	47	7	4	...	1	...	10	69	199·6
July	42	6	8	1	1	...	6	64	155·4
August ...	48	15	7	...	2	...	9	81	139·5
September	51	46	18	6	1	4	8	134	171·0
October ...	55	69	7	2	3	1	13	150	204·4
November	56	78	8	8	3	1	9	163	255·6
December.	50	60	14	1	2	5	11	143	242·1
Total	830	434	83	28	24	15	95	1509	249·6

SHOWING THE NUMBER OF VARIOUS DISEASES.

DISEASE	REMAINING IN HOSPITAL, JAN. 1ST, 1898	ADMITTED TO DEC. 31ST, 1898	DISMISSED, CURED, AND DIED DURING 1898	REMAINING IN HOSPITAL, DEC. 31ST, 1898
Scarlatina	356	830	1,067	119
Diphtheria	2	83	67	18
Enteric Fever.....	81	434	430	85
Pneumonia	1	13	9	5
Erysipelas	1	24	25	...
Morbilli .....	...	28	27	1
Unclassified	2	97	94	5
Total...	443	1,509	1,719	233

SCARLATINA.

AGE OF PATIENTS	MALE			FEMALE			TOTAL		
	Ad- mitted	Died	Mor- tality percent.	Ad- mitted	Died	Mor- tality per cent	Ad- mitted	Died	Mor- tality percent.
Under one year...	2	...	...	3	...	...	5	...	...
1 to 2 years...	15	5	33'3	12	4	33'3	29	9	33'3
2 to 3 „ ...	29	4	13'7	33	7	21'2	62	11	17'7
3 to 4 „ ...	43	5	11'6	32	7	21'8	75	12	16'0
4 to 5 „ ...	50	2	4'0	38	4	10'5	88	6	6'8
5 to 10 „ ...	172	7	4'1	178	7	3'9	350	14	4'0
10 to 15 „ ...	55	...	...	68	2	2'9	123	2	1'6
15 to 20 „ ...	24	...	...	26	3	11'5	50	3	6'0
20 to 25 „ ...	10	...	...	19	...	...	29	...	...
25 to 30 „ ...	4	...	...	9	...	...	13	...	...
30 to 35 „ ...	3	...	...	4	...	...	7	...	...
Over 35 „ ...	...	...	...	1	...	...	1	...	...
Total	407	23	5'7	423	33	7'8	830	56	6'7

Five deaths occurred within 48 hours of admission.

PERCENTAGE COMPLICATIONS DURING SCARLATINA.

AGE OF PATIENTS	Albumin.	Hæmorrhagic Nephritis	Nephritis	Otitis	Adenitis	Synovitis	Sc. Anginosa	Rhinitis
Under one year	20·0	...	...	40·0	20·0	...	...	...
1 to 2 years	13·7	3·4	6·8	20·6	20·6	...	17·2	20·6
2 to 3 „	16·1	...	6·4	29·0	12·9	...	4·8	32·2
3 to 4 „	13·3	12·0	5·3	32·0	20·0	...	4·0	36·0
4 to 5 „	18·1	12·5	3·4	34·1	15·9	...	2·2	44·3
5 to 10 „	10·8	9·1	3·7	16·8	14·0	1·4	2·0	29·1
10 to 15 „	21·1	4·1	3·2	8·9	11·3	1·6	1·6	15·4
15 to 20 „	10·0	4·0	10·0	4·0	4·0	...	2·0	6·0
20 to 25 „	31·1	...	6·8	...	3·4	...	...	...
25 to 30 „	7·6	...	15·3	...	...	...	...	...
Over 30 „	12·5	12·5	12·5	...	...	...	12·5	...

ENTERIC FEVER.

AGE OF PATIENTS	MALE			FEMALE			TOTAL		
	Admitted	Died	Mortality percent.	Admitted	Died	Mortality percent.	Admitted	Died	Mortality percent.
Under one year...	...	...	...	...	...	...	...	...	...
1 to 2 years...	1	1	100	1	...	...	2	1	50·0
2 to 3 „ ...	2	...	...	2	...	...	4	...	...
3 to 4 „ ...	8	...	...	3	...	...	11	...	...
4 to 5 „ ...	5	...	...	8	...	...	13	...	...
5 to 10 „ ...	26	3	11·5	25	1	4·0	51	4	7·8
10 to 15 „ ..	32	4	12·5	22	3	13·6	54	7	12·9
15 to 20 „ ...	46	8	17·3	29	7	24·1	75	15	20·0
20 to 25 „ ...	60	13	21·6	30	1	3·3	90	14	15·5
25 to 30 „ ...	40	3	7·5	18	6	33·3	58	9	15·5
30 to 35 „ ...	17	5	29·4	16	3	18·7	33	8	24·2
35 to 40 „ ...	14	5	35·7	7	...	...	21	5	23·8
40 to 45 „ ...	6	1	16·6	6	1	16·6	12	2	16·6
45 to 50 „ ...	3	...	...	4	3	75·0	7	3	42·8
Over 50 „ ...	2	2	100	1	...	...	3	2	66·6
Total...	262	45	17·1	172	25	14·5	434	70	16·1

NOTE.—Five deaths occurred within 48 hours of admission.

PERCENTAGE COMPLICATIONS DURING ENTERIC FEVER.

Age of Patients	Constipation	Diarrhoea	Hypostatic Pneumonia	Bronchitis	Relapse	Intestinal Hemorrhage	Perforation	Delirium	Abscesses	Laryngitis
Under 1 year .....	...	...	...	...	...	...	...	...	...	...
1 to 2 years .....	...	...	...	...	...	...	...	...	...	...
2 to 3 „	25·0	...	...	25·0	...	...	...	...	...	...
3 to 4 „	18·1	...	...	18·1	9·1	...	...	...	...	...
4 to 5 „	23·1	7·6	...	23·1	...	...	...	...	...	...
5 to 10 „	23·5	13·7	...	27·4	11·7	...	...	...	7·8	...
10 to 15 „	20·3	5·5	3·7	14·8	14·8	5·5	1·8	1·8	1·8	1·8
15 to 20 „	28·0	6·6	1·3	17·3	20·0	5·3	6·6	4·0	1·3	2·7
20 to 25 „	25·5	4·4	3·3	11·1	12·2	7·7	2·2	6·6	7·7	1·1
25 to 30 „	20·6	12·1	3·4	18·9	18·9	10·3	1·7	1·7	...	...
30 to 35 „	18·1	6·1	9·1	18·1	15·1	18·1	3·0	9·1	...	...
35 to 40 „	19·0	...	...	9·5	23·8	4·7	9·5	4·7	...	4·7
Over 40 „	13·6	...	...	...	18·0	13·6	...	9·1	4·5	...

MORBILLI.

AGE OF PATIENTS	MALE			FEMALE			TOTAL		
	Ad- mitted	Died	Mor- tality percent.	Ad- mitted	Died	Mor- tality percent.	Ad- mitted	Died	Mor- tality percent.
Under 1 year.....	...	...	...	1	...	...	1	...	...
1 to 2 years ...	1	...	...	2	...	...	3	...	...
2 to 3 „ ...	1	...	...	1	1	100	2	1	50
3 to 4 „ ...	1	...	...	5	...	...	6	...	...
4 to 5 „ ...	3	...	...	2	...	...	5	...	...
5 to 10 „ ...	3	1	33·3	4	...	...	7	1	14·2
10 to 15 „ ...	1	...	...	...	...	...	1	...	...
15 to 20 „ ...	...	...	...	...	...	...	...	...	...
20 to 25 „ ...	...	...	...	2	...	...	2	...	...
25 to 30 „ ...	...	...	...	1	...	...	1	...	...
Total...	10	1	10	18	1	5·5	28	2	7·14

ERYSIPELAS.

AGE OF PATIENTS	MALE			FEMALE			TOTAL		
	Ad-mitted	Died	Mor-tality per cent.	Ad-mitted	Died	Mor-tality per cent.	Ad-mitted	Died	Mor-tality per cent.
Under 5 years ...	1	1	100	...	...	...	1	1	100
5 to 10 years ...	...	...	...	1	...	...	1	...	...
10 to 15 „ ...	1	...	...	1	...	...	2	...	...
15 to 20 „ ...	2	...	...	2	...	...	4	...	...
20 to 25 „ ...	...	...	...	1	...	...	1	...	...
25 to 30 „ ...	3	...	...	2	...	...	5	...	...
30 to 35 „ ...	2	...	...	...	...	...	2	...	...
35 to 40 „ ...	2	1	50	...	...	...	2	1	50
40 to 45 „ ...	2	...	...	...	...	...	2	...	...
45 to 50 „ ...	1	...	...	...	...	...	1	...	...
Over 50 „ ...	2	...	...	1	...	...	3	...	...
Total...	16	2	12.5	8	...	...	24	2	8.3

PNEUMONIA.

AGE OF PATIENTS	MALE			FEMALE			TOTAL		
	Ad-mitted.	Died.	Mor-tality per cent.	Ad-mitted.	Died.	Mor-tality per cent.	Ad-mitted.	Died.	Mor-tality per cent.
Under one year...	...	...	...	1	1	100	1	1	100
1 to 2 years ...	1	1	100	1	...	...	2	1	50
2 to 3 „ ...	...	...	...	1	...	...	1	...	...
3 to 4 „ ...	...	...	...	2	...	...	2	...	...
4 to 5 „ ...	2	...	...	...	...	...	2	...	...
5 to 10 „ ...	2	...	...	3	...	...	5	...	...
10 to 15 „ ...	...	...	...	...	...	...	...	...	...
15 to 20 „ ...	...	...	...	...	...	...	...	...	...
20 to 25 „ ...	...	...	...	1	...	...	1	...	...
25 to 30 „ ...	...	...	...	...	...	...	...	...	...
30 to 35 „ ...	...	...	...	...	...	...	...	...	...
Over 35 „ ...	1	...	...	...	...	...	1	...	...
Total ...	6	1	16.6	9	1	11.1	15	2	13.3

UNCLASSIFIED CASES.

DISEASE	MALE	FEMALE	DISEASE	MALE	FEMALE
			Brought forward...	28	16
Abscess (cerebellum)	2	...	Sinus (Knee)	1	...
„ (vulva) .....	...	1	Pyosalpinx .....	...	1
Bronchitis	3	1	Peritonitis .....	...	1
Phthisis	1	2	Hysteria .....	...	1
Constipation .....	...	1	Tubercular Meningitis	1	...
Cellulitis	3	...	Pyæmia .....	...	1
Parotitis	1	...	Otitis Media	1	...
Puerperal Fever ...	...	6	Gastric Catarrh	2	1
Ulcerated Alœ Nasi...	...	1	Pleuritis .....	...	1
Copaiba Rash	1	...	Suppur. Phlebitis ...	...	1
Syphilitic Dermat. ...	1	...	Enteritis .....	...	2
Secondary Syphilis ...	1	...	Diarrhœa .....	...	2
Gonorrhœa	1	...	Lichen .....	...	1
Laryngitis	4	...	Anæmia .....	...	1
Dentition	1	...	Eczema	1	...
Lymphangitis .....	...	1	Varicella	1	...
Tonsillitis	5	1	Adenitis .....	...	1
Appendicitis .....	...	1	Gastritis .....	...	1
Rötheln	3	...	Neurasthenia .....	...	1
Morbus Cordis	1	...	General Atrophy.....	...	1
*Baby .....	...	1	Anthrax	1	...
Carried forward.....	28	16	Total...	36	33

NOTE.—Four died within 48 hours of admission.

* Admitted with mother.

Patients with no stated illness	27
Patients unclassified	68
Total...	95
Patients cured	80
Patients died (7 male and 8 female)	15
Total...	95
Net Mortality on Unclassified Cases	15·7

CASE MORTALITY FOR 1892-98.

Year 1892	12·32	Year 1896	10·60
„ 1893	9·36	„ 1897	8·60
„ 1894	7·82	„ 1898	10·70
„ 1895	9·73		

Total average Case Mortality for the last seven years—9·87.

YEAR	DISEASE	MORTALITY PER CENT.	YEAR	DISEASE	MORTALITY PER CENT.
1889	Scarlatina	8·7	1889	Enteric fever	18·6
1890	Do.	12·2	1890	Do.	16·4
1891	Do.	6·9	1891	Do.	19·1
1892	Do.	9·1	1892	Do.	19·1
1893	Do.	6·9	1893	Do.	18·6
1894	Do.	4·4	1894	Do.	15·9
1895	Do.	7·1	1895	Do.	20·1
1896	Do.	8·5	1896	Do.	19·6
1897	Do.	6·1	1897	Do.	13·3
1898	Do.	6·7	1898	Do.	16·1

DIPHTHERIA.

During the year, 83 cases of this disease were admitted, and the age and sex distribution are shown in the following table :—

AGE OF PATIENTS	MALE			FEMALE			TOTAL		
	Ad-mitted	Died	Mor-tality percent.	Ad-mitted	Died	Mor-tality percent.	Ad-mitted	Died	Mor-tality percent.
1 to 2 years ...	2	...	...	1	...	...	3	...	...
2 „ 3 „ ...	5	2	40·0	4	...	...	9	2	22·2
3 „ 4 „ ...	4	2	50·0	6	...	...	10	2	20·0
4 „ 5 „ ...	6	2	33·3	8	1	12·5	14	3	21·4
5 „ 10 „ ...	15	1	6·6	16	4	25·0	31	5	16·1
10 „ 15 „ ...	3	...	...	5	2	40·0	8	2	25·0
15 „ 20 „ ...	2	...	...	1	1	100·0	3	1	33·3
20 „ 25 „ ...	...	...	...	...	...	...	...	...	...
25 „ 30 „ ...	...	...	...	2	...	...	2	...	...
30 „ 35 „ ...	1	...	...	1	...	...	2	...	...
Over 35 years ...	...	...	...	1	...	...	1	...	...
Total	38	7	18·4	45	8	17·7	83	15	18·1

Nine deaths occurred within 48 hours of admission.

Of these nine cases, two were moribund, and died very shortly after admission; whilst of the remaining seven, tracheotomy had to be performed in three instances.

With the exception of the two moribund cases above mentioned, antitoxin was injected in all cases, showing undoubted clinical signs of the disease. Twenty-one patients were admitted in whom the Löffler's bacillus had been demonstrated, but in whom no signs of membrane could be detected. There was soreness of the throat, with general congestion, and slight swelling in all cases. In 16 out of the 21 there was some enlargement and tenderness of the glands at the angles of the jaw, and occasionally there was pyrexia for one or two days, the temperature reaching 101° Fahr. in three cases only. In addition, seven of the cases or 33·3 per cent., had albuminuria, and one had nephritis. In none of these patients did post-diphtheritic paralysis develop, and all recovered, though antitoxin was not administered.

Amongst the remaining 62 cases there were 15 deaths. These fatal cases may be tabulated as follows as regards the immediate cause of death:—

CAUSE OF DEATH	MALE	FEMALE	TOTAL
Nephritis	2	2	4
Cardiac Failure	3	7	10
Pneumonia	1	...	1

In seven of the 15 cases the symptoms of cardiac failure and nephritis were combined.

As already mentioned, nine deaths occurred within 48 hours, a period too short in which to allow of any efficient action on the part of the antitoxin. They might truly be classed as “moribund on admission.” In the remaining six the condition of the throat had recovered, or was improving as the result of the injection, though the previous toxæmia caused death from cardiac paralysis in three, and from nephritis in two. The remaining death was due to pneumonia twelve days after tracheotomy.

In the 47 cases treated by antitoxin which recovered, the time elapsing from the onset of the attack to the administration of the antitoxin was, on an average, five days, and the membrane had completely disappeared from the throat, on an average, 4·7 days after the injection.

Twenty-one cases had albuminuria and 21 nephritis, an average of 44·68 per cent. for each complication, whilst four of them suffered from post-diphtheritic paralysis, making an average for this sequela of 8·51 per cent. In two of the cases tracheotomy had to be performed, and here it may be remarked that since the injection of antitoxin has been practised in the hospital, tracheotomy has on no occasion been necessary where the patient has been able to continue for three days after its administration.

In accordance with the resolution of the Committee, all cases have been retained in the hospital until the swab from the throat has been reported by Professor Delépine as free from bacilli. The average stay in hospital before this freedom has been obtained was 41·91 days.

As mentioned in the report for last year, the mere perusal of the figures for such a small number of cases, many of them admitted at a very late period of the disease, gives but a poor idea of the value of antitoxin. On the other hand, the fact that no advance takes place in the local condition after 24 hours from the injection, the regularity in time with which the membrane disappears, the rapid improvement in the appearance of the throat, the disappearance of glandular enlargement, the cessation of discharges from the nose, &c., and the earliness with which a subjective feeling of improvement occurs in those who are old enough to express themselves, all show unmistakably that the injection puts an end to the further progress of the disease. Moreover, from observations of the numerous instances in which during the past year injections have been made, either as a prophylactic or at an early period before changes due to the absorption of the diphtheritic toxins have taken place, one can say with certainty that the injection is practically always devoid of serious consequences. One case only developed pyrexia and temporary albuminuria immediately after, whereas in all the other instances no change could be found in the urine.

During the past year, with the antitoxin supplied by the British Institute of Preventive Medicine, there has been a remarkable absence of the occurrence of joint pains and rashes.

R. W. MARSDEN,

Medical Superintendent.

ADDENDA.

The staff at Monsall at the end of March, 1899, consisted of the following :—

- 1 Medical Superintendent.
- 3 Medical Assistants.
- 1 Lady Superintendent of Nurses.
- 1 House Matron.
- 1 Assistant House Matron.
- 3 Chaplains.
- 1 Clerk and Dispenser.
- 1 Night Superintendent of Nurses.
- 73 Sisters, Nurses, Probationers.
- 20 Home and Ward Maids.
- 27 Cooks, Servants, Seamstresses, Laundry Maids.
- 9 Joiners, Plumbers, Porters, &c.
- 11 Temporary Labourers, &c.
- 5 Gardeners.

156

In addition, there were 34 labourers, &c., working in laying out the grounds under the direction of Mr. Lamb, but the wages of these men are being paid out of capital account

The 156 may be taken as about the number of the regular staff, but it will fluctuate a little, according to the extent to which infectious disease is prevalent. Of the staff of 156, 127 are provided with accommodation and rations.

A statement of receipts and expenditure for the year ending March 31st, 1899, is appended herewith. This will prove useful for comparison with the expenditure of other hospitals.

During the year 1898 the Sanitary Committee had under their consideration the provision of additional buildings, so as to complete the equipment of the hospital. These additions and alterations were approved by the Council, and, after an enquiry, the Local Government Board approved of the plans and the expenditure of £27,500 on condition that the Council guaranteed that no more cases of smallpox should be nursed at Monsall. This undertaking was given.

PROPOSED ADDITIONAL BUILDINGS.—MONSALL HOSPITAL.

BLOCK PLAN.





The following are particulars of the proposed works, with the estimate prepared by the City Surveyor:—

	£	s.	d.
Isolation ward.....	1,561	0	0
Erysipelas ward	995	0	0
Dining halls, kitchen, &c.	2,118	0	0
Annexe to the nurses' block	1,684	0	0
Servants' bedrooms.....	2,223	0	0
Additions to laundry, &c.	2,112	0	0
Coal place	99	0	0
Porter's cottage	400	0	0
Food stores	257	0	0
Drainage of new buildings.....	500	0	0
Brick boundary walling	3,351	0	0
Gates and doors	62	0	0
Taking down, altering as required, and refixing close-boarded fence, and one coat of jodelite	289	0	0
Wrought-iron fence, including four coats of paint ...	1,031	0	0
Boilers and laundry machinery	1,200	0	0
Refixing present cooking apparatus, including new steam main from the boiler house, and four radiators for heating the dining halls.....	100	0	0
Laying out, planting, and land drainage for the entire site	6,000	0	0
Additional gas mains	180	0	0
Provision for various small improvements inside the existing buildings.....	200	0	0
	24,362	0	0
Contingencies, say	3,138	0	0
	£27,500	0	0

The block plan attached herewith, which has been prepared by the City Surveyor, will give some idea of what the Monsall Hospital Estate will be when the alterations and additions have been carried out.

The Sanitary Committee have accepted tenders for the isolation ward and the annexe to the Nurses' Home, and this work is now being proceeded with, and tenders for other blocks are being obtained by the City Surveyor.

REPORT BY MR. A. T. ROOK, SUPERINTENDENT OF THE SANITARY DEPARTMENT.

Sanitary Department,

Town Hall, Manchester,

February 6th, 1899.

In presenting to the Medical Officer of Health the report of the work transacted in the Sanitary Department for the year ending 30th April, 1898, I beg to state that the City, for inspection and other purposes, is divided into 28 districts, to each of which one Sanitary Inspector has been assigned.

In addition to these, there is a Superintendent, two Chief Inspectors, three Drainage, four Smoke, one Canal Boats and Lodging-house, two Adulteration of Food, six Factory and Workshops Inspectors, and two Drain Examiners.

In the House Drainage Department there are also five Clerks of Works for supervising and measuring up work done by the contractors employed by the department in carrying out private drainage work.

The number of complaints of nuisances of various kinds made during the year was 42,805, viz. :—

3,577	through the Medical Officer of Health's Department
2,214	by the Public.
1,370	through the Police.
35,644	by the Staff.

The number of inspections and re-inspections was as follows* :—

39,093	Dwelling-houses.
2,350	Inspections and
6,203	Re-inspections of infected dwelling-houses.
658	Factories and Workshops.
314	Cellars.
459	Offensive trades.
85	Slaughter-houses.
474	Schools.
2,046	Mills.
354	Tips.
21,523	Miscellaneous.

* See also table for the year ending December 31st, 1897 (page 242), relating to nuisances.

In 2,266 houses and premises smoke or water tests have been applied to the drains for the purpose of discovering defects.

For the abatement of nuisances of various kinds, 12,888 notices were served, viz. :—

To abate overcrowding	...	...	...	...	...	...	...	...	168
To cleanse and limewash houses	...	...	...	...	...	...	...	...	477
To cleanse privies	...	...	...	...	...	...	...	...	51
To cleanse workshops	...	...	...	...	...	...	...	...	623
To discontinue nuisances arising from black smoke being emitted from chimneys	...	...	...	...	...	...	...	...	191
To repair, &c., house drains	...	...	...	...	...	...	...	...	2,765
To register houses occupied by lodgers	...	...	...	...	...	...	...	...	456
To remove offensive deposits, stagnant water, &c.	...	...	...	...	...	...	...	...	592
To abate nuisances arising from animals kept in a filthy state, or to remove such animals...	...	...	...	...	...	...	...	...	103
To repair, renew, or provide privies, ashpits, or water-closets...	...	...	...	...	...	...	...	...	1,201
To repair yards and passages	...	...	...	...	...	...	...	...	1,582
To repair dilapidated houses	...	...	...	...	...	...	...	...	2,600
To cleanse and disinfect dilapidated houses	...	...	...	...	...	...	...	...	1,670
To provide urinals to public and beer houses	...	...	...	...	...	...	...	...	24
To close houses in a dilapidated, &c., condition and consequently unfit for human habitation	...	...	...	...	...	...	...	...	37
To place bakehouses in a proper sanitary condition	...	...	...	...	...	...	...	...	16
To place workshops in a proper sanitary condition	...	...	...	...	...	...	...	...	234
To provide satisfactory means of escape in case of fire at factories and workshops	...	...	...	...	...	...	...	...	60
To close workshops unfit for use on sanitary grounds	...	...	...	...	...	...	...	...	17

There have been 30,414 re-inspections made, after notices, to ascertain if the work had been done.

HOUSES LET IN LODGINGS.

Under the powers given by section 90 of the Public Health Act, the bye-laws made thereunder have been strictly enforced.

The number of houses on the register is 1,396.

To these, 1,864 day visits and 413 night visits have been paid.

Fifty-six infringements of the regulations have been reported and dealt with.

One hundred and forty night visits have also been paid to unregistered houses, the occupiers having previously denied that lodgers were kept.

DAIRIES, MILKSHOPS, AND COWSHEDS REGULATIONS.

Under this Order, which was made in July, 1879, 2,488 milkshops and dairies and 103 cowkeepers are now on the register. The number of cows kept is 1,345. The number of visits to dairies, milkshops, and cowsheds was 2,054.

The sheds of two cowkeepers have been closed during the year.

It may be stated that many of the dairies and cowsheds are not in a very satisfactory condition, and great reluctance has been shown in the past, in consequence of the very serious structural alterations required, especially in cowsheds, to enforce the alterations necessary to bring them up to the present state of sanitary requirements. The new regulations, it is hoped, will enable the Inspectors to deal more effectually with insanitary cowsheds, &c., and already, under the advice of the Medical Officer of Health, five notices have been served.

WORKSHOPS, BAKEHOUSES, AND SHOP HOURS ACTS.

During the year the Act has been fairly well observed, only a few persons ^{Shop Hours Act} having been reported for infringements.

Experience still further confirms the opinion expressed last year that in the absence of a declaration specifying the working hours for each day, as in the case of the Factory and Workshop Acts, it is difficult to produce sufficient evidence to justify prosecutions, the evidence of the young persons in nearly every instance, probably through the influence of their employers or other reasons, contradicting the signed declarations previously made to the Inspectors.

Great improvements have been effected since the last report in the condition ^{Workshop Acts} of workshops, many alterations having been made—either after notice or at the request of the Inspectors—to improve the ventilation, lighting, overcrowding, cleansing, and general sanitary conditions.

Special attention has also been given to see that premises are provided with sufficient and satisfactory closet accommodation, this being a common defect in a number of the largest workshops.

In many of the cases reported the necessary accommodation has been provided, and others are under notice, and will be dealt with in due course.

Means
of escape in case
of fire

With regard to means of escape in case of fire, the whole of the factories and workshops in the City have been inspected, and as a result a large number were, in the opinion of the Inspectors, found to be unsatisfactory, and have been referred to the City Surveyor for his report thereon.

In several of the worst cases the necessary provision has been made ; while the others, some of which are under notice, are receiving attention, and in another year it is hoped that every building in the City coming within the Act will in this respect be rendered perfectly safe.

Periodical changes will, of course, from time to time take place in various ways which will bring buildings within the meaning of the Act, and necessitate the constant supervision of the Inspectors, and action on the part of the authorities.

Bakehouses

During the year several more of the worst bakehouses in the City have been absolutely closed, and a number of others have been reported by the Medical Officer of Health to be unfit for use until satisfactory alterations are made to place the premises in a better sanitary condition.

Extensive alterations have been made in many of the bakehouses, and a general improvement is manifest throughout the City consequent upon the action taken by the department.

Out-workers

Many visits have been paid to houses in which out-work is carried on, but constant visitation is necessary to maintain the standard of cleanliness which is to be desired, especially in houses in which shirt-making, handkerchief-hemming, brace-making, and umbrella-covering, &c, is done. This class of work is almost exclusively confined to the poorer people, who live in small houses in the congested parts of the City.

The people, as a rule, appear willing to carry out any suggestion made by the Inspectors to keep their houses clean ; but, at the same time, it is almost impossible for small houses, sometimes containing large families, to be kept in such a satisfactory condition as workshops.

The work done under the above Acts is shown in the following tables :—

SHOWING THE WORK DONE BY THE INSPECTORS UNDER THE SHOP HOURS AND FACTORY AND WORKSHOPS ACTS,
MAY 1ST, 1897, TO APRIL 30TH, 1898.

Number of District	INSPECTOR	SHOPS					WORKSHOPS						Factories and Workshops not provided with proper means of escape in case of fire		BAKEHOUSES					
		Number of visits	Number of Infringements of Act reported	Number of cases in which Magisterial proceedings have been taken	Number registered during the year	Total number on register	Number of visits	Number in which Sanitary Defects were found	Number of Reports referred to Factory Inspector (unregistered factories, &c.)	Number of cases in which Magisterial proceedings have been taken	Number registered during the year	Total number on register	Number of visits to houses where outworkers are employed	Factories and Workshops not provided with proper means of escape in case of fire	Number of visits	Number in which Sanitary defects were found (principally cleansing)	Number of reports referred to Factory Inspector	Number of cases in which Magisterial proceedings have been taken	Number registered during the year	Total number on register
1	Edward E. Roberts	380	6	2	26	580	3524	310	222	35	226	999	14	19	473	43	8	13	7	74
2	John Kewley	237	4	1	12	865	3099	216	231	9	243	1121	2	25	938	80	19	1	19	158
3	Ernest Bailey	310	1	...	19	658	2552	158	151	3	157	1210	1	6	846	92	5	2	4	134
4	Francis J. Rowe	98	2	...	12	780	3124	216	187	1	193	1158	...	9	1179	20	14	2	12	104
...	Emma Coppock	2132	1	1	163	...	2153	99	2	...	2	...	1310	...	2	...	...	...	...	...
...	Alice Tattersall	1502	9	1	111	...	2103	39	1	1	...	...	1862	...	...	...	...	...	...	...
...	TOTALS.....	4659	23	5	343	2883	16555	1038	794	49	821	4488	3189	59	3438	235	46	18	42	470

PROSECUTIONS FOR OFFENCES, WITH RESULTS.

Name of Offender	Address of Offender	Offence	Amount of Fine Imposed	Amount of Costs ordered to be Paid	Dismissed, withdrawn, &c.
Ann Elizabeth Willan	2 and 4, Deansgate.....	Employing two young persons over 74 hours per week in contravention of the Shop Hours Act	£	£	Dismissed
Albert Cave	272, Waterloo Road	Ditto (one)	0 2 6	0 2 6	.....
James Clinton	211, Every Street, Ancoats.....	Ditto	0 10 0	0 8 6	.....
Jas. Jno. Summerfield	4, Ludlow Street, C-on-M.	Ditto	0 10 0	0 8 6	.....
Frederick Schofield.	86a, King Street	Not exhibiting Abstract of Shop Hours Act in a conspicuous position in his shop	.....	0 3 0	Withdrawn
Chadwick Sunley ...	396, Stockport Road	Ditto	0 2 6	0 2 6	.....
Fredk. Sl. Bellhouse	2a, Lister Street	Ditto	0 2 6	0 2 6	.....
Simeon Leah.....	134, Oxford Street, C-on-M. ...	Ditto	.....	0 3 0	Withdrawn
John Hy. Baines ...	13, Market Street	Ditto	.....	.....	Dismissed
George Wood	159, Chester Road	Ditto	.....	0 3 0	Withdrawn
Jacob Marcovitch...	3, Nightingale Street	Having his bakehouse in a dirty condition	0 10 6	0 8 6	.....
Minnie Carnofski ...	22, Bury New Road	Ditto	0 5 0	0 5 0	.....
Meyer Solomon ...	41, Lord Street, Cheetham.....	Ditto	0 15 0	0 8 6	.....
Henry Woolhouse...	1, Kay Street, Openshaw	Ditto	.. ...	.....	Withdrawn
Jacob Kafkervitch ..	2a, Scotland, Red Bank	Ditto	0 15 0	0 8 6	...
Joseph Copeland ...	4a, Pimblott Street, Cheetham..	Ditto	0 10 0	0 8 6	.....
Eli Morris	11, Lord Street, Red Bank ...	Ditto	0 15 0	0 8 6	.....
		Carried forward.....£	4 18 0	4 1 0	

PROSECUTIONS FOR OFFENCES, WITH RESULTS—*continued.*

Name of Offender	Address of Offender	Offence	Amount of Fine Imposed		Amount of Costs ordered to be Paid		Dismissed, withdrawn, &c.		
Rd Sharrocks & Sons	12 and 14, Rusholme Road ...	Having his bakehouse in a dirty condition	£ 4	s. 18	d. 0	£ 4	s. 1	d. 0	Withdrawn
Harris Bernstein ...	117, Gt. Ducie Street	Ditto	0	10	0	0	8	6	.....
Alfred Inman	109, Oldham Road	Ditto	1	0	0	0	8	6	.....
George Hy. Morgan	263, Ashton Old Road, Ardwick	Ditto		.....		0	3	0	Withdrawn
Louis Cohen	21, Honey Street, Red Bank...	Ditto	0	10	0	0	8	6	.....
Hannah Mary Newton	22, Cleveland Rd., Hr. Crumpsall	Ditto		..	...	0	3	0	Withdrawn
Simon Rubenstein...	37, Bury New Road	Ditto	1	0	0	0	8	6	.....
Harris Glaskie	76, Berkeley Street	Ditto	0	10	0	0	8	6	... ..
John Thompson ...	66a, Back Grafton Street	Ditto	0	5	0	0	5	0	.....
John Rogerson	54, Rusholme Road	Ditto		.....		0	3	0	Withdrawn
Sarah Gordon	94, Cheetham Hill Road	Ditto	0	5	0	0	5	0	.....
Louisa Lang	12, Sherbourne Street, Cheetham	Ditto	0	5	0	0	5	0	.....
Jos. Thos. Roberts..	13, Watling Street, Shudehill...	Neglecting to abate overcrowding in her workshop after notice	0	10	6	0	16	0	and order to abate made
Samuel Wynn	129, Stockport Road	Neglecting to ventilate his workshop after notice		.....			.....		Withdrawn (work done)
		Neglecting to cleanse and purify his workshop, or closets of same, after notice		.....			.....		Do.
Wm. Edwards	Bank Street, Hr. Openshaw	Ditto		.....		0	3	0	Do.
Harris Payman	46, Moreton Street	Ditto		.....		0	3	0	Do.
	Carried forward	£	9	8	6	8	4	6	

PROSECUTIONS FOR OFFENCES, WITH RESULTS—*continued.*

Name of Offender	Address of Offender	Offence	Amount of Fine Imposed	Amount of Costs ordered to be Paid	Dismissed, Withdrawn, &c.
Antonia Garrara ...	20, Canal Street, Princess Street	Brought forward..... Neglecting to cleanse and purify his workshop, or closets of same, after notice	£ 9 s. 8 d.	£ 8 s. 4 d.	Withdrawn (removed)
Louisa Belovitch ...	144, Long Millgate	Ditto	.....	.....	Do.
Joseph Lang.....	131, Gt. Ducie Street.....	Ditto	.....	7 6	(work done) Order to abate made
Robert Bouch	11, Hayes Street, Miles Platting	Ditto	.....	7 6	Do.
Lydia Ransford.....	192, Brunswick Street, C.-on-M.	Ditto	.....	3 0	Withdrawn
Paul Buchner	1, Mousell Street, Cheetham....	Ditto	.....	.....	(work done) Withdrawn
Barnet Simpson ...	Ditto	Ditto	.....	7 6	(removed) Order to abate made
Abraham Whyman	Ditto	Ditto	.....	7 6	Do.
Moses Franks	12 Robert Street, Cheetham ...	Ditto	.....	7 6	Do.
Abraham Wheeler ..	Ditto	Ditto	.....	7 6	Do.
Isaac Goldberg....	Ditto	Ditto	.....	7 6	Do.
Moses Goodman ...	Ditto	Ditto	.....	7 6	Do.
Morris Goldberg ...	Ditto	Ditto	.....	7 6	Do.
James Holland	Ditto	Ditto	.....	.....	Do.
Israel Norr	Ditto	Ditto	.....	7 6	Do.
Carried forward			£ 9 s. 8 d.	12 2 6	

PROSECUTIONS FOR OFFENCES, WITH RESULTS—continued.

Name of Offender	Address of Offender	Offence	Amount of Fine Imposed	Amount of Costs ordered to be Paid	Dismissed, withdrawn, &c.
Edwin Sutton	23, Cross Street, Shudehill ...	Brought forward.....	£ 9	£ 12	
Louis Harris.....	23, Irwell Street, Cheetham.....	Neglecting to abate overcrowding of workshop after notice	s. 8	s. 2	d. 6
Louis Goodfield ...	22, Cheetwood Street	Neglecting to ventilate workshop after notice	.....	7	6
Carl Scher.....	Behind 13, Park Street, Cheetham	Ditto	.....	.....	Order to abate made Withdrawn (work done)
Marks Goodman ...	Ditto	Neglecting to cleanse, &c. closets of workshop after notice	.....	.....	Do.
Joseph Kersh	6, Robert Street, Cheetham ...	Ditto	.....	7	6
Hy. M. Feinberg ...	Ditto	Ditto	.....	7	6
Harris Isaacs	10, Ditto	Ditto	.....	7	6
Barnett Simpson ...	1, Mousell Street, Cheetham ...	Ditto	.....	7	6
Abraham Whyman	Ditto	Ditto	0 5	5	0
Abraham Rosenthal	Ditto	Ditto	0 5	5	0
Charles Wooster ...	83, Great Ancoats Street	Neglecting to cleanse and purify workshop or closets of same after notice	.....	7	6
James Royle.....	11, Chapel Walks	Neglecting to place workshop, 1, Britannia Street, in a proper sanitary condition after notice	.....	3	6
John Davies	1, Ruby Street, Hulme	Occupying premises unfit for use on sanitary grounds after notice	.....	.....	Withdrawn
		Carried Forward.....	9 18 6	15 8 6	

PROSECUTIONS FOR OFFENCES, WITH RESULTS—*continued*

Name of Offender	Address of Offender	Offence	Amount of Fine Imposed		Amount of Costs ordered to be Paid		Dismissed, Withdrawn, &c.		
Tobias Baker	126, Long Millgate.....	Neglecting to limewash workshop after notice	£ 9	s. 18	d. 6	£ 15	s. 8	d. 6	Withdrawn (work done)
Garside Brierley ...	86, Great Ancoats Street	Neglecting to place workshop, 63, Ancoats Street in a sanitary condition after notice		.....			.....		Withdrawn (work done)
Henry Ashworth ...	3, Reather Court, Lloyd Street	Neglecting to limewash workshop after notice		.....			.....		Withdrawn (removed)
Worsleys Limited ...	Limebank Street, Ashton Old Rd.	Ditto	0	10	0	0	8	6	.....
Philip Hart	52 and 54, Oldham Street	Ditto		.....		0	3	0	Withdrawn (work done)
Matthew Rourke ...	162a, Rochdale Road.....	Ditto		.....		0	3	0	Ditto
John McDonough...	31, Marshall Street, Oldham Road	Ditto		.....		0	3	0	Ditto
Barnet Rosenthal ...	15, Thompson Street, Cheetham	Ditto		.....		0	3	0	Ditto
Jas. Butterworth ...	491, Rochdale Road	Ditto		.....		0	3	0	Ditto
Joseph Sorrin	29, Bury New Road	Ditto	0	10	0	0	8	6	.....
John Williams	72, Market Street, Blackley ...	Neglecting to repair roof of workshop, 76, Market Street, Blackley, after notice		.....			.....		Withdrawn (work done)
Joseph Walker	Halton, near Runcorn.....	Ditto		.....			.....		Ditto
Simon Greenberg ...	5, Peel Street, City	Neglecting to ventilate workshop after notice		.....			.....		Ditto
Samuel Goldfish ...	26, Fennell Street	Ditto		.....			.....		Ditto
TOTAL.....£			10	18	6	17	0	6	

SMOKE NUISANCES.

For the abatement of smoke nuisances, the four Inspectors appointed specially for this work have taken 2,111 timed observations of half-an-hour each, with the result that 191 notices for the abatement of nuisances have been served. In addition to which, proceedings before the Magistrates have been ordered in 163 cases out of 308 offences reported. These cases were disposed of as follows :—

One hundred and fifty-seven were summoned before the Justices, in 104 of which fines were imposed amounting to £205 17s. 6d., and costs £46 16s.

Four were ordered to pay costs only.

Thirty-four orders of abatement were granted and served, and 15 cases were excused, dismissed, or withdrawn.

Much attention during the past year, as will be seen by the above, has been given to the nuisance caused by the emission of black smoke, not only from the furnaces connected with boilers in mills, warehouses, and other works, but also from chemical and other industries, and the efforts made have already resulted in a considerable reduction of the nuisance. It is hoped that the proceedings now pending against certain grave offenders will have a further beneficial effect. It is much to be regretted that many of the Authorities bordering the City, especially on the North-east and West sides, take so little interest in the prevention of this kind of nuisance, from which Manchester citizens suffer so severely.

SALE OF FOOD AND DRUGS ACTS AND MARGARINE ACT.

Under these Acts, the two Inspectors specially appointed have purchased for analysis 1,760 samples. Of these, 42 only were adulterated, viz. :—

Butter	...	...	...	...	...	...	...	...	16
Coffee	...	...	...	...	...	...	...	...	1
Milk	...	...	...	...	...	...	...	...	19
Mustard	...	...	...	...	...	...	...	...	4
Spirits	...	...	...	...	...	...	...	...	2

Forty-one summonses were issued. In 37 cases fines were imposed amounting in the aggregate to £81 6s, with costs £50 6s. 6d.

Four summonses were dismissed or withdrawn.

Appended are tables showing the result of the action taken under the Acts since 1873.

Showing the number of Articles of Food and Drugs procured for Analysis, the number Adulterated, the number informally purchased or in which no proceedings were taken, and the number of cases in which Magisterial Proceedings were taken, together with the Decisions and the Total Amount of Fines imposed from May 1st, 1873, to April 30th, 1898.

Article	No. Procured	No. Adulterated	No. informally purchased or in which no proceedings were taken	No. Summoned before Magistrates.				Total Amount of Fines Imposed		
				No. Summoned	No. Fined	Warrants granted	No. ordered to pay Costs only— Dismissed or Withdrawn			
								£	s.	d.
Arrowroot	6	...	...	...	...	...	...	.....
Bacon	1	...	...	...	...	...	...	.....
Baking Powder.....	19	...	...	...	...	...	...	.....
Beef Dripping	1	...	...	...	...	...	...	.....
Beer.....	280	2	2	...	...	...	...	.....
Bread	910	39	7	32	32	...	...	119	10	0
Butter	1353	273	21	252	195	3	54	275	0	6
Buttermilk.....	2	2	2	...	...	...	...	.....
Cheese	70	4	2	2	2	...	...	3	10	0
Chicory	40	...	...	...	...	...	...	.....
Cider.....	1	...	...	...	...	...	...	.....
Cocoa	1	...	...	...	...	...	...	.....
Cod Liver Oil	6	...	...	...	...	...	...	.....
Coffee	395	37	1	36	35	...	1	56	5	6
Confectionery	223	2	...	2	2	...	...	10	0	0
Cream	1	...	...	...	...	...	...	.....
Drugs	250	10	9	1	1	...	...	0	5	0
Fish (tinned).....	1	...	...	...	...	...	...	.....
Flour	16	...	...	...	...	...	...	.....
Fruit (tinned)	2	...	...	...	...	...	...	.....
Jams	142	1	...	1	1	...	...	1	0	0
Jelly	2	...	...	...	...	...	...	.....
Ketchup	1	...	...	...	...	...	...	.....
Lard	573	27	5	22	18	...	4	44	3	6
Meats (Tinned).....	6	...	...	...	...	...	...	.....
Milk	15660	1344	20	1324	913	...	411	2776	2	6
Milk (skimmed)	139	23	...	23	18	...	5	39	1	6
Milk (condensed)	6	...	...	...	...	...	...	.....
Mineral Waters, &c....	220	79	76	3	...	...	3	.....	
Carried forward.....	20327	1843	145	1698	1217	3	478	3324	18	6

Article	No. Procured	No. Adulterated	No. informally purchased or in which no proceedings were taken	No. Summoned before Magistrates.				Total amount of Fines Imposed
				No. Summoned	No. Fined	Warrants granted	No. ordered to pay Costs only— Dismissed or Withdrawn	
Brought forward	20327	1843	145	1698	1217	3	478	£ s. d. 3324 18 6
Mustard.....	218	43	6	37	32	...	5	18 9 0
Oatmeal.....	44	...	...	...	...	...	...	.....
Olive Oil	12	1	...	1	1	...	...	2 6
Pepper	373	5	...	5	4	...	1	1 7 6
Pickles	4	...	...	...	...	...	...	.....
Porter	4	...	...	...	...	...	...	.....
Rice, Tapioca, &c.....	72	...	...	...	...	...	...	.....
Spices	142	1	...	1	...	...	1	.....
Spirits	651	25	4	21	19	...	2	31 2 6
Sugar.....	43	...	...	...	...	...	...	.....
Tea	291	3	1	2	2	...	...	2 0 0
Treacle	6	...	...	...	...	...	...	.....
Tripe	1	...	...	...	...	...	...	.....
Vegetables (tinned) ...	8	2	2	...	...	...	...	.....
Vinegar.....	127	8	...	8	7	...	1	2 10 6
Wines	35	...	...	...	...	...	...	.....
Totals.....	22358	1931	158	1773	1282	3	488	3380 10 6

Other Offences against the Acts.

Offence	No. Summoned	No. Fined	No. Dismissed or Withdrawn	Total amount of Fines Imposed
				£ s. d.
Refusing to serve Inspector with Samples of Food	17	17	...	62 12 6
Giving False Warranty	11	3	8	16 0 0
Totals.....	28	20	8	£78 12 6

Total amount of Penalties for Adulteration... ..	£3,380	10	6
Total amount of Penalties for Other Offences.....	78	12	6
	£3,459	3	0
Total amount of Penalties against Farmers	£1,716	1	0

Showing the number of persons summoned more than once under the Adulteration of Food and Drugs and Margarine Acts from May 1st, 1873, to April 30th, 1898.

MILK DEALERS.

No.	Article	1st Offence	2nd Offence	3rd Offence	4th Offence	In County (Salford)
		£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
1	Milk.	0 5 0 8 <i>W</i>	Withdrawn 10 <i>W</i>	1 0 0 16 <i>W</i>	.....	.....
2	Do.	10 0 0 60 <i>F</i>	10 0 0 11½ <i>F</i>	.....	.....	.....
3	Do.	10 0 0 66 <i>F</i>	5 0 0 64 <i>F</i>	1 0 0 9½ <i>W</i>	5 0 0 (<i>Skimmed Milk</i>) 8 <i>W</i>	10 0 0 2 0 0 1 0 0 5 0 0
4	Do.	0 10 0 6½ <i>W</i> & 5 <i>F</i>	2 0 0 9 <i>W</i>	.....	.....	.....
5	Do.	3 0 0 (Refusing)	10 0 0 9 <i>W</i>	5 0 0 56 <i>F</i>	.....	.....
6	Do.	2 0 0 11 <i>W</i>	2 cases Withdrawn (Farmer fined) 20 <i>F</i> each	2 0 0 10 <i>W</i> & 17 <i>F</i>	5 0 0 44 <i>F</i>	.....
7	Do.	2 0 0 5 <i>W</i>	Withdrawn 11½ <i>W</i>	6 0 0 1½ <i>W</i> & 15 <i>F</i>	10 0 0 2 <i>W</i> & 33 <i>F</i>	.....
8	Do.	3 0 0 10 <i>W</i> & 25 <i>F</i>	1 0 0 5 <i>W</i>	.....	.....	.....
9	Do.	1 1 0 24 <i>W</i>	1 1 0 30 <i>F</i>	.....	.....	.....
10	Do.	2 0 0 (Refusing)	Withdrawn (Farmer fined) 8 <i>F</i>	2 10 0 12 <i>W</i>	5 0 0 8 <i>W</i>	.....
11	Do.	2 0 0 10 <i>W</i>	Withdrawn (Farmer fined) 7 <i>W</i>	2 0 0 5 <i>W</i>	.....	.....
12	Do.	1 0 0 40 <i>F</i>	1 0 0 7 <i>W</i>	5 0 0 (Refusing)	.....	.....
13	Do.	1 1 0 8½ <i>W</i>	5 0 0 14 <i>W</i>	2 0 0 12 <i>W</i>	1 10 0 8 <i>W</i>	2 0 0 20 0 0
14	Do.	10 0 0 20 <i>W</i>	5 0 0 13 <i>W</i>	5 0 0 10 <i>W</i>	.....	.....

The figures in *Italic* denote the percentage of water added and fat abstracted.

FARMERS.

No.	Article	1st Offence	2nd Offence	3rd Offence	4th Offence	5th Offence	6th Offence	7th Offence	8th Offence	9th Offence	10th Offence	In County
		£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
15	Milk	4 0 0 7 <i>W</i>	10 0 0 4½ <i>W</i>	20 0 0 10 <i>W</i>	Dis- missed 9½ <i>W</i>	Dis- missed 8 <i>W</i>	...	...	...	...	...	15 0 0 (Strange- ways)
		<i>Heard same day</i>		<i>Heard same day</i>		<i>Heard same day</i>						
16	Do.	5 0 0 12 <i>W</i>	Costs only 26 <i>W</i>	Dis- missed 4½ <i>W</i>	Dis- missed 6½ <i>W</i>	3 0 0 10½ <i>W</i>	3 0 0 11½ <i>W</i>	...	...	...	...	...
17	Do.	10 0 0 33 <i>F</i>	2 cases 20 0 0 28 <i>F</i> 28 <i>F</i>	...	...	...	...	...	...	...	...	...
18	Do.	15 0 0 (In 2 cases) 20 <i>F</i> 20 <i>F</i>	15 0 0 (In 3 cases) 4½ <i>W</i> 5 <i>W</i> 8 <i>W</i>	...	...	...	...	...	...	...	Hanley, Staffs.	40 0 0 (In 4 cases)
19	Do.	2 cases Dis- missed 4 <i>W</i> & 8 <i>W</i>	Dis- missed 10 <i>W</i>	...	...	...	...	...	...	...	...	2 0 0 Gorton 8 <i>W</i>
20	Do.	2 0 0 (In 3 cases) 6 <i>W</i> 4 <i>W</i> 10 <i>W</i>	4 0 0 (In 2 cases) 8 <i>F</i> 13 <i>F</i>	...	...	...	...	...	...	...	...	...
21	Do.	5 0 0 7½ <i>W</i>	2 0 0 (In 2 cases) 28 <i>F</i> 10 <i>F</i>	...	...	...	...	...	...	...	...	...
22	Do.	10 0 0 (In 2 cases) 10 <i>W</i> 4½ <i>W</i>	1 0 0 (In 4 cases) 16 <i>F</i> 45 <i>F</i> 30 <i>F</i> 31 <i>F</i>	...	...	...	...	...	...	...	...	...
23	Do.	2 0 0 8 <i>W</i>	10 0 0 10 <i>W</i>	5 0 0 (Refus- ing)	...	...	...	...	...	...	...	...
24	Do.	2 0 0 4½ <i>W</i>	2 0 0 (In 2 cases) 9½ <i>W</i> 6 <i>W</i>	...	...	...	...	...	...	...	...	...
25	Do.	4 0 0 (In 2 cases) 28 <i>F</i> 33 <i>F</i>	10 0 0 (In 2 cases) 10 <i>F</i> 10 <i>W</i>	...	...	...	...	...	...	...	...	...

The figures in *Italic* denote the percentage of water added and fat abstracted.

FARMERS—continued.

No.	Article	1st Offence	2nd Offence	3rd Offence	4th Offence	5th Offence	6th Offence	7th Offence	8th Offence	9th Offence	10th Offence	In County
		£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
26	Milk	15 0 0 <i>30 W</i>	20 0 0 <i>39 W</i>	10 0 0 (Refus- ing)	10 0 0 (Refus- ing)	10 0 0 <i>14 W</i>	5 0 0 (Refus- ing)	20 0 0 <i>14 W</i>	20 0 0 <i>12 W</i>	10 0 0 <i>15 W</i>	10 0 0 <i>8 W</i>	20 0 0 (Strange- ways)
27	Do.	2 0 0 <i>12 F</i>	5 0 0 <i>4½ W</i> <i>15 F</i>	...	...	...	...	...	...	...	...	...
28	Do.	2 0 0 (In 2 cases) <i>20 W</i> <i>29 W</i>	2 0 0 <i>23 W</i>	...	...	...	...	...	...	...	...	...
29	Do.	4 0 0 (In 2 cases) <i>7 W</i> <i>10 W</i>	5 0 0 (In 2 cases) <i>8 W</i> <i>8 W</i>	...	...	...	...	...	...	...	...	...
30	Do.	5 0 0 <i>20 F</i>	5 0 0 <i>13 W</i>	...	...	...	...	...	...	...	...	...
31	Do.	1 0 0 <i>10 F</i>	5 0 0 <i>20 F</i>	10 0 0 <i>6 W</i>	2 cases 5 0 0 <i>10 W</i> <i>6 W</i>	5 0 0 <i>12 F</i>	2 0 0 <i>6 W</i>	...	...	...	...	...
32	Do.	3 0 0 <i>12½ W</i>	5 0 0 <i>8 W</i>	...	...	...	...	...	...	...	...	...
33	Do.	15 0 0 (In 3 cases) <i>7 W</i> <i>12 W</i> <i>11 W</i>	10 0 0 <i>20 W</i>	...	...	...	...	...	...	...	...	...
34	Do.	2 0 0 <i>10 F</i>	5 0 0 <i>11 W</i>	5 0 0 <i>11 W</i>	3 cases 20 0 0 <i>11 W</i> <i>15 W</i> <i>15 W</i>	...	...	...	...	...	Altr'nc- ham Salford Do.	Dis missed 2 0 0 2 0 0
<i>Heard same day</i>												
35	Do.	15 0 0 <i>17 W</i>	5 0 0 <i>17 W</i>	...	...	...	...	...	...	...	Salford L'pool Do.	10 0 0 10 0 0 10 0 0
36	Do.	10 0 0 (In 2 cases) <i>44 F</i> <i>25 F</i>	5 0 0 <i>8½ W &</i> <i>7 F</i>	...	...	...	...	...	...	...	...	...
37	Do.	2 cases 5 0 0 5 0 0 <i>7 W</i> <i>10 W</i>	2 cases 10 0 0 10 0 0 <i>16 W</i> <i>13 W</i>	...	...	...	...	...	...	...	...	...
38	Do.	2 cases 1 0 0 1 0 0 <i>17 F</i> <i>20 F</i>	10 0 0 <i>7 W</i>	...	...	...	...	...	...	...	...	...

The figures in *Italic* denote the percentage of water added and fat abstracted.

BUTTER CASES.

No.	1st Offence	2nd Offence	3rd Offence	4th Offence
	£ s. d.	£ s. d.	£ s. d.	£ s. d.
39	Costs only July 19th, 1878 (Butterine)	2 0 0 Dec. 7th, 1887 (Butterine)	Withdrawn Jan. 11th, 1893 (Excess Water) <i>10 per cent.</i>	Withdrawn Jan. 11th, 1893 (Excess Water) <i>8½ per cent.</i>
40	2 0 0 Jan. 13th, 1886 (Butterine)	1 0 0 Dec. 7th, 1887 (Butterine)	....	....
41	2 0 0 April 16th, 1884 (Butterine)	2 0 0 Jan. 15th, 1886 (Butterine)	Costs only Jan. 10th, 1894 (Packet not marked Margarine)	....
42	2 0 0 April 16th, 1884 (Butterine)	3 0 0 Dec. 22nd, 1886 (Butterine)	3 0 0 March 5th, 1890 (Margarine)	3 0 0 March 5th, 1890 (Margarine)
43	2 0 0 May 21st, 1884 (Butterine)	5 0 0 Jan. 13th, 1886 (Butterine)	5 0 0 Dec. 7th, 1887 (Butterine)	....
44	0 10 0 Dec. 7th, 1887 (Butterine)	Dismissed March 14th, 1894 (Excess Water) <i>6 per cent.</i>	Dismissed March 14th, 1894 (Excess Water) <i>5½ per cent.</i>	....
45	2 0 0 March 31st, 1886 (Butterine)	1 1 0 May 2nd, 1888 (Margarine)	....	....
46	Dismissed April 8th, 1885 (Butterine)	2 0 0 Dec. 7th, 1887 (Butterine)	....	....
47	Do.	Do.	....	....
48	2 0 0 April 16th, 1884 (Butterine)	10 0 0 Nov. 13th, 1889 (Margarine)	....	....
49	1 1 0 Dec. 7th, 1887 (Butterine)	2 0 0 April 17th, 1889 (Margarine)	....	....
50	5 0 0 March 21st, 1888 (Margarine)	Withdrawn Jan. 11th, 1893 (Excess water) <i>9 per cent.</i>	....	....
51	0 5 0 March 13th, 1889 (Margarine)	Dismissed Jan. 23rd, 1894 (Excess Water) <i>11½ per cent.</i>	....	....
52	0 5 0 Oct. 3rd, 1888 (Margarine)	Dismissed March 14th, 1894 (Excess Water) <i>7 per cent.</i>	....	....

The figures in *Italic* denote the percentage of water added and fat abstracted.

CANAL BOATS ACTS.

The number of canal boats on the register is 431.

The number inspected was 1,911, resulting in nine infringements of the Act being discovered, which were referred to the Justices to be dealt with; in seven cases fines were imposed amounting in the aggregate to £1 9s. od., and the costs £2 8s. 6d., and in 2 cases the persons were ordered to pay costs only. In addition to the above, five ships were also inspected and found satisfactory.

One hundred and twenty-nine caution notices were sent to the owners and masters.

 OFFENSIVE TRADES.

The number of offensive trades on the register is 266. These have been placed under close supervision, and periodical visits paid.

 UNHEALTHY DWELLINGS.

During the year, 625 houses were certified to be dealt with by the Sanitary Committee.

Of these, 580 were ordered to be closed.

A large proportion of these houses have since had structural alterations made to them which satisfied the requirements of the Medical Officer of Health, and have since been allowed to be reinhabited.

 CLOSET ACCOMMODATION TO WORKSHOPS,
WAREHOUSES, &c.

One hundred and thirteen properties were reported as being deficient in closet accommodation, and 79 public and beer houses as being without or having unsatisfactory urinal accommodation.

In a large number of cases the necessary accommodation has been provided, and in others orders have been made to provide the necessary accommodation, or the reports are under consideration.

DRAINAGE WORK DONE BY THE HOUSE DRAINAGE DEPARTMENT.

During the year 1,019 cases of non-compliance with Notices have been referred by the District Sanitary Inspectors to the House Drainage Department to carry out the necessary work; 196 requests have been received from owners without notice having been served, and 273 orders from other Departments of the Corporation to execute work.

The whole of these included 5,006 private houses and 211 business premises.

The cost of the work executed amounted to the large sum of £29,359 19s. 3d., which was apportioned as follows:—£20,657 4s. 7d. to the Owners, and £8,702 14s. 8d. to the Highways and City Fund Account.

PARTICULARS RELATING TO THE OPERATIONS OF THE CLEANSING COMMITTEE.

Cleansing Department,
Town Hall, Manchester,
July 19th, 1899.

Dear Sir,—In response to your request, I now have pleasure in giving you the following information:—There are within the City, pail-closets, 76,663; ash-boxes, 56,824; midden privies, 22,935; wet middens, 12,161; dry middens, 743; water-closets, 35,807; and cesspools, 90. The pail-closets are systematically emptied at regular intervals—once, twice, or thrice weekly, as necessity demands. The midden-privies are emptied as required. The contents of the pail-closets are taken to Holt Town and Water Street. At Holt Town the fæcal matter is dried into concentrated manure. The dry refuse is consumed in the Galloway boilers, and generates the steam required for working the machinery. The worthless fine ash, which cannot be consumed, is deposited at the nearest tip at Clayton Bridge. The privy refuse and fæcal matter which is taken to Water Street is sent away in its crude state as night-soil to Carrington Moss and to farmers in Cheshire. Dry combustible matter is passed into the destructor furnaces or under the Galloway boilers at Water Street, and there destroyed. A large quantity of fine ash at Water Street is used as an absorbent for the fæcal matter from the pail-closets.

The market garbage, of which we have 5,765 tons per annum, is carted to Water Street, and there loaded into boats and sent away to farmers and Carrington Moss immediately. Slaughter-house refuse is collected from the abattoirs and private slaughter-houses and sent to Holt Town, where it is

passed through dryers, and evaporated to dryness; the dry material is then added to our concentrated manure. Street sweepings are generally deposited at the nearest depot, and after being allowed to drain are carted to the nearest tip.

The total quantity of material collected by this Department during the past year amounted to 336,385 tons.

We have within the City about 60 destructor furnaces of different kinds, and last year 16,000 tons of mortar was made from the clinker which is obtained from such furnaces.

We employ nearly 100 "orderly" boys, who collect horse-droppings and litter from the street, and deposit the same in the bins which are fixed in the footpaths. The contents of the bins are removed twice daily, and taken to the nearest depot.

With regard to the removal of the contents of the pails from Typhoid Fever cases: Acting upon instructions we received from you, special pails and lids are supplied for all cases of Enteric Fever; labels are attached to the pails, asking the occupants to use disinfectants, which are supplied with the pails; the pails are left in the yard, and not placed in the ashplace. The occupants of the houses are requested to use this special pail for the reception of the faecal matter and washings from the patient only. The pails are removed periodically in a specially constructed vehicle, and taken to Holt Town depot, where the contents are destroyed.

With regard to the cleansing of passages, we have a staff of about 40 men engaged specially upon this work. They regularly, at least once a week, cleanse the back passages in certain districts, and during last year 351,574 swillings and cleansings were effected in courts and passages.

During the year 72,601 barrels of water were used in degging the streets, and 267,870 grids were unstopped.

During the past eight years we have deposited upon the various tips within the City the following quantities of material, viz.:—In 1892, 99,866 tons; 1893, 109,078 tons; 1894, 103,949 tons; 1895, 113,836 tons; 1896, 107,883 tons; 1897, 99,658 tons; 1898, 96,635 tons; and in 1899, 104,481 tons. The bulk of this material was deposited on the tips at Clayton and Harpurhey. It is composed principally of dry ashes, street sweepings, and bell-dust. Occasionally the contents of dry middens are sent there. During last year 42,364 tons of material was sent to Carrington Estate and 10,780 to Chat Moss Estate.

Yours faithfully,

G. PLANT,

Superintendent.

Dr. Niven,

Medical Officer of Health,

Town Hall, Manchester.

CITY ABATTOIRS,

January 16th, 1899.

Dr. Niven,
 Medical Officer of Health,

Sir,—I herewith submit the following report with reference to unwholesome food condemned in this City under the Public Health Act of 1875 during the year ending December 31st, 1898 :—

MEAT AND FISH.	MISCELLANEOUS.
Beef .....114,954 lbs.	Bananas 53 cases
Mutton..... 6,447 „	Tomatoes 60 boxes
Veal 6,131 „	Lemons 13½ „
Pork 24,761 „	Oranges..... 2 „
Venison 1,802 „	Pears 8 „
Total .....154,095 lbs.	„ 74 baskets
Fish .....135,976 lbs.	Plums.....124 „
Shell-fish .....100,361 „	Cherries 86 „
Total.....236,337 lbs.	Gooseberries..... 49 „
Rabbits .....8,725 head	Black Currants..... 1 „
Game : Hares 198 „	Strawberries 3 „
Partridges ... 123 „	Grapes 2 „
Grouse 58 „	„ 2 barrels
Snipe 1 „	Mushrooms .....130 baskets
Black Game .. 40 „	Potatoes..... 1 barrel
„ ... 5 boxes	Onions 1 box
Quails 120 head	„ 3 bags
Poultry : Turkeys ... 44 head	Turnips .....181 „
Geese 23 „	Sprouts 14 „
Ducks 337 „	Cress 13 hampers
Fowls 349 „	Celery 48 bundles
Pigeons ... 59 „	Yeast..... 24 bags
	Eggs 3 cases
	Cheese 2
	Hazel Nuts .....164 lbs.

The number of carcases, portions of carcases, consignments of fish, etc., condemned during the year has been 1,902, and from the following causes :—

Decomposing	1,312	Peritonitis	6
Tuberculosis	255	Hydatid Disease	6
Smothered	61	Actinomycosis	5
Unmarketable	52	Pleurisy	2
Inflammation	44	Poisoning	2
Injured	33	Unseasonable	2
Dropsy	23	Rheumatism	2
Emaciation	19	Uræmia	1
Parturient Fever	19	Necrosis	1
Abcesses	17	Heart Disease	1
Fever	10	Septicæmia	1
Choked	10	Pneumonia	1
Swine Fever.....	9	Purpura	1
Liver Rot	7		

Of the meat, fish, etc., there was condemned :—

In the Abattoirs and Carcase Markets	120,931	lbs.
(67,217 lbs. of which was dressed meat con- signed from places other than the City).		
„ Pig Market.....	8,197	„
„ Private Slaughter-houses	15,376	„
„ Railway Stations.....	2,108	„
„ Shops and Stores	2,316	„
„ Carts in Streets	410	„
„ Cold Air Stores	2,484	„
„ Rusholme Abattoirs	60	„
„ Farms	420	„
„ Fish Market (Fish)	236,337	„
„ „ „ (Venison)	1,802	„

The game, poultry, and rabbits (except 59 head) were condemned in the Wholesale and Retail Fish and Poultry Markets, the fruit and vegetables in the Smithfield Market and in hawkers' carts.

With the exception of 4,790lbs. of meat, 67 rabbits, six head of poultry, four boxes of kippers, and a quantity of hazel-nuts, which were seized while deposited or exposed for the purpose of sale, the above amounts were surrendered by the trade after being condemned by the Inspectors.

Eighteen orders for the destruction of unsound food have been obtained at the City Police Courts during the year.

There have been five prosecutions, and in each instance a fine has been imposed, the fines in the aggregate amounting to £23 10s. and costs, with £2 extra costs in one case.

In addition to the inspection at the Abattoirs and Markets, 3,411 visits have been made to the private slaughter-houses (327 being at the request of the butchers). 11,819 carcases were examined in them ; 40 carcases, and portions of 16 others, being condemned as unfit for human food.

DISEASES OF ANIMALS.

During the year there have been five outbreaks of *glanders* in the City. Eight horses have been slaughtered and their carcasses destroyed, being affected with that disease. Their total value was £113. Three of the animals, and six others which had been in contact with diseased ones, were tested with mallein, the three reacting to the inoculation; post-mortem examination confirmed the accuracy of the test.

There has been one case of *sheep-scab*.

Of *swine fever* there have been three outbreaks during the year. The total number of swine which had been in contact with diseased ones on the different premises was 448, of which 48 were slaughtered by the owners, 391 dealt with by the Board of Agriculture, compensation being paid for them, and 9 left alive, the owners refusing to accept the valuation offered by the Board. With the exception of the Pig Market, where the first outbreak of the disease occurred, the premises still remain under the restrictions of the Board of Agriculture.

Examination has been periodically made of all cows in the cow sheds within the City, attention being paid to the health of the cattle and the condition of their udders. Three cows have been removed from the sheds for slaughter by the owners after the Inspectors had informed them as to their condition.

Special visits have been paid to 18 farms in different parts of the country by request of the Sanitary Committee, and upon examination of the cattle diseased animals were found at most of the farms. In all, 440 cows were examined, and of that number 46 showed clinical symptoms of tuberculosis and 27 had derangement of the udder, probably of a tuberculous nature.

By the request of the Medical Officer of Health, I have visited two farms (one twice), and tested with tuberculin 310 milch cows; 115 reacted, thus indicating the presence of disease. The milk from the sound animals was for the supply of Monsall Hospital.

During the year (by kind permission of the Chairman, Markets' Committee), a series of experiments have been conducted at the Abattoirs, with a view to ascertaining the reliability of tuberculin as a test for the presence of tuberculosis.

One hundred and fifty-three animals—cows, heifers, and bullocks—were tested, and it was proved conclusively and satisfactorily that the use of the re-agent under proper conditions was an almost infallible aid in the diagnosis of the disease.

JAMES KING, M.R.C.V.S.,
Chief Inspector.

TABLES.

TABLE A, 1898—continued.

CAUSES OF DEATH	AGES AT DEATH													
	All Ages	UNDER 5 YEARS		5 to 10	10 to 15	15 to 20	20 to 25	25 to 35	35 to 45	45 to 55	55 to 65	65 to 75	75 to 85	85 and upwards
		0 to 1	1 to 5											
III.—Dietetic Diseases.														
Starvation, Want of Breast Milk	2	1	...	...	...	...	...	...	...	...	...	1	...	...
Scurvy	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Intem: { Chronic Alcoholism	40	...	...	...	...	...	...	5	13	12	9	1	...	...
{ Delirium Tremens	11	...	...	...	...	...	...	2	7	2	...	...	...	...
IV.—Constitutional Diseases.														
Rheum: Fev: Rheum: of Heart	47	...	1	6	5	6	7	8	6	3	3	2	...	...
Rheumatism	39	...	...	...	1	1	3	5	6	3	10	5	3	2
Gout	3	...	...	...	...	...	...	...	1	1	1	...	...	...
Rickets	33	15	18	...	...	...	...	...	...	...	...	...	...	...
Cancer	394	...	1	1	2	2	2	21	49	101	125	70	20	...
Tabes Mesenterica	105	58	43	1	1	...	...	2	...	...	...	...	...	...
Tuberc: Mening: (Hydroceph:)	163	43	88	23	4	1	1	2	1	...	...	...	...	...
Phthisis	1,056	9	15	20	21	57	86	223	289	204	96	33	3	...
Other forms of Tuberc: Scrofula	201	57	65	19	11	10	6	11	9	5	5	3	...	...
Purpura, Hæmorrhagic Diathesis	9	4	..	1	1	...	1	...	...	...	1	1	...	...
Anæmia, Chlorosis, Leucocy : .	26	...	2	...	1	...	2	6	4	5	3	3	...	...
Diabetes Mellitus.....	35	...	...	...	1	3	1	9	4	4	7	5	1	...
Other Constitutional Diseases...	2	...	...	...	...	...	...	...	2	...	...	...	...	...
V.—Developmental Diseases.														
Premature Birth	373	373	...	...	...	...	...	...	...	...	...	...	...	...
Atelectasis	21	20	1	...	...	...	...	...	...	...	...	...	...	...
Cyanosis	28	26	...	2	...	...	...	...	...	...	...	...	...	...
Spina Bifida	13	13	...	...	...	...	...	...	...	...	...	...	...	...
Imperforate Anus.....	6	6	...	...	...	...	...	...	...	...	...	...	...	...
Cleft Palate Harelip.....	8	8	...	...	...	...	...	...	...	...	...	...	...	...
Other Congenital Defects	18	17	...	...	1	...	...	...	...	...	...	...	...	...
Old Age.....	219	...	...	...	...	...	...	...	...	...	12	76	108	23
VI.—Local Diseases.														
1.—NERVOUS SYSTEM(DIS: OF).														
Inflam: of Brain or its Mem: ...	169	57	63	11	5	2	1	7	10	4	6	2	1	...
Apoplexy	290	2	1	1	...	1	...	3	21	54	98	85	22	2
Softening of the Brain.....	36	...	...	...	...	...	...	1	3	2	14	11	5	...
Hemiplegia, Brain Paralysis	105	...	2	...	...	...	...	...	9	11	30	44	8	1
Paralysis Agitans	1	...	...	...	...	...	...	...	...	...	1	...	...	...
Insanity, Gen: Par: of Insane...	92	...	...	...	...	2	...	11	19	16	16	18	8	2
Chorea	4	...	...	2	...	...	...	...	...	1	1	...	...	...
Epilepsy.....	33	...	...	3	2	...	5	7	8	4	1	3	...	...
Convulsions	209	172	33	3	...	...	...	...	1	...	...	...	...	...
Laryngismus Stridulus.....	13	7	6	...	...	...	...	...	...	...	...	...	...	...
Idiopathic Tetanus	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Paraplegia, Dis: of Spinal Cord	39	...	2	...	...	1	1	4	4	13	7	7	...	...
Other Diseases of Nervous Sys:	57	8	8	1	1	1	4	5	10	11	5	2	1	...
2. ORGANS OF SPECIAL SENSE (DISEASES OF).														
Otitis, Otorrhœa	11	3	1	2	2	1	1	1	...	...	...	...	...	...
Epistaxis and Disease of Nose	2	1	...	...	...	...	...	...	...	...	1	...	...	...
Ophthalmia and Disease of Eye.	...	...	...	...	...	...	...	...	...	...	...	...	...	...
3. CIRCULATORY SYS: (DIS: OF)														
Endocarditis	19	...	...	2	...	1	4	2	4	2	1	1	2	...
Valvular Disease	217	1	1	7	10	6	10	26	33	33	46	30	13	1
Pericarditis	15	...	2	2	2	...	...	1	2	2	2	1	1	...
Hypertrophy of Heart.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Angina Pectoris	16	...	...	...	...	...	...	1	3	3	5	4	...	...
Syncope	107	8	1	...	...	...	...	...	5	11	19	27	27	9

TABLE A, 1898—continued.

CAUSES OF DEATH	AGES AT DEATH													
	All Ages	UNDER 5 YEARS		5 to 10	10 to 15	15 to 20	20 to 25	25 to 35	35 to 45	45 to 55	55 to 65	65 to 75	75 to 85	85 and upwards
		0 to 1	1 to 5											
3. CIRCULATORY SYS: (DIS: OF) (continued)														
Aneurism	13	...	...	...	...	...	...	1	5	3	3	1	...	...
Senile Gangrene	19	...	...	...	...	...	...	...	...	...	4	10	3	2
Embolism, Thrombosis	24	...	1	...	...	...	1	5	5	3	4	1	4	...
Phlebitis.....	5	...	...	...	...	...	...	1	2	2	...	...	...	...
Varicose Veins	1	...	...	...	...	...	...	...	...	...	1	...	...	...
Other Dis : of Circulatory Sys :	615	5	3	5	13	12	8	53	80	132	168	119	35	2
4. RESPIRATORY SYS: (DIS: OF)														
Laryngitis	22	1	15	2	...	...	...	1	...	...	2	1	...	...
Croup	6	1	3	2	...	...	...	...	...	...	...	...	...	...
Other Dis: of Larynx and Trachea	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Emphysema, Asthma	15	...	...	...	...	...	...	3	1	2	4	5	...	...
Bronchitis	981	277	102	6	...	4	2	12	49	97	150	173	95	14
Pneumonia.....	1,188	265	291	35	11	17	25	82	135	131	118	59	18	1
Pleurisy	34	4	1	...	...	1	3	1	7	6	9	2	...	...
Other Dis: of Resp: System ...	65	17	5	1	...	...	...	2	10	7	4	11	7	1
5. DIGESTIVE SYS: (DIS: OF).														
Stomatitis	6	4	2	...	...	...	...	...	...	...	...	...	...	...
Dentition	78	49	29	...	...	...	...	...	...	...	...	...	...	...
Sore-throat, Quinsy.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Dyspepsia	18	10	1	...	...	...	...	...	...	...	4	2	1	...
Hæmatemesis	5	...	...	...	...	1	1	...	...	2	1	...	...	...
Melæna .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Diseases of Stomach	85	32	8	1	1	3	2	4	12	5	4	11	1	1
Enteritis.....	100	67	19	1	...	1	1	...	2	2	3	2	2	...
Ulceration of Intestine	5	...	...	...	1	1	...	...	1	1	1	...	...	...
Ileus, Obstruction of Intestine..	28	1	...	1	...	1	1	2	5	5	5	7	...	...
Strict: or Strang: of Intestine...	4	1	...	...	...	...	...	...	1	1	...	1	...	...
Intussusception of Intestine ...	4	1	3	...	...	...	...	...	...	...	...	...	...	...
Hernia	22	4	1	...	...	1	...	...	4	3	2	6	1	...
Fistula	1	...	...	...	...	...	...	...	...	1	...	...	...	...
Peritonitis	40	1	2	2	5	2	3	8	8	4	4	1	...	...
Ascites	1	...	...	...	...	...	...	...	1	...	...	...	...	...
Gallstones	3	...	...	...	...	...	...	...	1	...	2	...	...	...
Cirrhosis of Liver.....	69	...	...	...	...	...	1	3	21	21	18	4	1	...
Other Diseases of Liver	55	18	2	1	...	...	1	2	7	4	11	7	1	1
Other Dis: of Digestive System	20	2	4	1	...	1	1	2	2	2	1	2	2	...
6. LYMPH: SYS: AND DUCTLESS GLANDS (DIS: OF).														
Diseases of Lymphatic System.	9	...	...	2	...	...	1	1	2	1	2	...	...	...
Diseases of Spleen	2	...	1	...	...	...	...	...	...	...	1	...	...	...
Bronchocele	5	...	...	...	...	...	1	1	1	1	1	...	...	...
Addison's Disease.....	1	...	...	...	1	...	...	...	...	...	...	...	...	...
7. URINARY SYSTEM (DIS: OF).														
Acute Nephritis	54	2	9	3	...	2	3	4	8	9	10	4	...	...
Bright's Disease	181	...	4	...	2	1	4	19	25	50	45	25	6	...
Uræmia	7	...	...	...	...	...	1	...	2	...	1	3	...	...
Suppression of Urine	3	...	...	...	...	...	...	1	...	...	2	...	...	...
Calculus	4	...	...	...	...	...	...	1	1	1	...	1	...	...
Hæmaturia.....	1	...	...	...	...	...	...	...	...	...	...	...	1	...
Dis: of Bladder and Prostate ...	30	...	1	...	...	...	1	1	1	...	10	12	4	...
Other Dis: of Urinary System..	12	...	...	...	...	1	...	1	2	...	...	5	3	...
8. REPRODUCTIVE SYSTEM (DISEASES OF).														
(a) Generative Organs (Dis: of):														
Ovarian Disease	7	...	...	...	...	...	...	1	1	3	1	1	...	...
Diseases of Uterus and Vagina.	5	...	...	...	...	...	...	1	2	1	...	1	...	...
Disorders of Menstruation	1	...	...	...	...	...	...	1	...	...	...	...	...	...

TABLE A, 1898—concluded.

CAUSES OF DEATH	AGES AT DEATH													
	All Ages	UNDER 5 YEARS		5 to 10	10 to 15	15 to 20	20 to 25	25 to 35	35 to 45	45 to 55	55 to 65	65 to 75	75 to 85	85 and pwards
		0 to 1	1 to 5											
8. REPRODUCTIVE SYSTEM (DIS: OF)—continued.														
Pelvic Abscess	4	...	...	...	...	...	1	2	1	...	...	...	...	...
Perineal Abscess	2	...	...	...	...	...	...	...	...	...	1	...	...	1
Dis: of Testes, Penis, Scrotum, &c.	5	...	...	...	...	1	1	2	...	...	1	...	...	...
(b) Parturition, Disease of:														
Abortion, Miscarriage	4	...	...	...	...	...	1	2	1	...	...	...	...	...
Puerperal Mania	1	...	...	...	...	...	...	1	...	...	...	...	...	...
Puerperal Convulsions .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Placenta Prævia, Flooding	13	...	...	...	...	...	1	7	5	...	...	...	...	...
Phlegmasia Dolens .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Other Accidents of Childbirth .	9	...	...	...	...	...	1	6	2	...	...	...	...	...
9. LOCOMOTOR SYS: (DIS: OF).														
Caries, Necrosis	14	...	4	2	2	1	...	2	1	1	1	...	...	...
Arthritis, Ostitis, Periostitis.....	5	...	2	1	...	...	...	...	1	...	1	...	...	...
Other Dis: of Locom: Sys: ...	5	...	...	...	...	...	1	...	1	1	1	1	...	...
10. INTEGUMENTARY SYSTEM (DISEASES OF).														
Carbuncle	4	...	...	...	...	...	...	...	1	...	1	1	1	...
Phlegmon, Cellulitis.....	9	4	1	...	...	...	...	...	...	3	...	...	1	...
Lupus .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Ulcer, Bedsore	8	...	...	...	...	...	...	...	2	...	3	2	1	...
Eczema	5	4	1	...	...	...	...	...	...	...	...	...	...	...
Pemphigus.....	1	...	...	...	...	...	...	...	...	...	1	...	...	...
Other Dis: of Integ: Sys:	2	...	1	...	...	...	...	...	...	...	1	...	...	...
VII.—Violence.														
1. ACCIDENT OR NEGLIGENCE.														
Fractures, Contusions	134	4	15	8	4	6	6	16	14	21	16	17	6	1
Gunshot Wounds	1	...	...	...	...	...	...	1	...	...	...	...	...	...
Cut, Stab	2	...	...	...	...	...	1	...	...	...	...	1	...	...
Burn, Scald	53	2	24	10	2	1	2	1	4	1	5	...	1	...
Poison	13	...	1	1	1	1	1	...	1	4	2	1	...	...
Drowning	31	1	7	4	1	2	...	4	3	6	1	1	1	...
Suffocation.....	74	66	...	...	...	...	...	2	2	2	1	1	...	...
Otherwise	5	...	2	...	...	...	...	...	...	2	1	...	...	...
2. HOMICIDE.														
Murder, Manslaughter.....	7	1	1	...	...	...	...	1	2	1	1	...	...	...
3. SUICIDE.														
Gunshot Wounds	1	...	...	...	...	...	...	...	...	1	...	...	...	...
Cut, Stab	10	...	...	...	...	...	...	1	4	2	2	1	...	...
Poison.....	20	...	...	...	...	2	4	...	6	3	4	1	...	...
Drowning	3	...	...	...	...	...	...	2	...	1	...	...	...	...
Hanging.....	17	...	...	...	...	...	2	...	2	4	5	4	...	...
Otherwise	5	...	...	...	...	...	1	...	2	1	1	...	...	...
4. EXECUTION :—Hanging.														
...
VIII.—Ill-defined and not Specified Causes.														
Dropsy	2	...	...	...	...	...	...	...	...	...	1	1	...	...
Debility, Atrophy, Inanition ...	677	589	44	1	...	...	...	...	...	3	7	14	18	1
Mortification	1	...	...	...	...	...	...	...	...	1	...	...	...	...
Tumour	6	1	...	...	...	...	...	...	1	...	1	2	1	...
Abscess	3	...	...	...	...	...	...	...	1	1	...	...	1	...
Hæmorrhage ..	3	...	...	...	...	...	...	...	...	...	2	1	...	...
Sudden (cause unascertained)...	123	46	14	...	1	...	1	1	11	12	19	12	6	...
Other Ill-def: not spec: causes.	101	52	3	...	...	...	...	3	6	10	13	12	2	...

TABLE B.

1898.—SUMMARY OF TABLE A, COMPARED WITH AVERAGE DEATHS IN GROUPS
OF DISEASES, 1891-97.

	DEATHS	
	1898	Average 1891-97
I.—Specific Febrile, or Zymotic Diseases :		
1. Miasmatic Diseases	748	1,279
2. Diarrhoeal „	1,090	660
3. Malarial „	1	...
4. Zoogenous „ .....	...	2
5. Venereal „	63	71
6. Septic „	61	84
II.—Parasitic Diseases.....	6	7
III.—Dietetic Diseases	53	63
IV.—Constitutional Diseases	2,113	2,081
V.—Developmental Diseases	686	628
VI.—Local Diseases :		
1. Diseases of Nervous System	1,048	1,235
2. Diseases of Organs of Special Sense	13	20
3. Diseases of Circulatory System	1,051	916
4. Diseases of Respiratory System	2,311	2,801
5. Diseases of Digestive System	544	556
6. Diseases of Lymphatic System and Duct- less Glands	17	11
7. Diseases of Urinary System	292	266
8. Diseases of Reproductive System :		
(a) Diseases of Generative Organs...	24	29
(b) Diseases of Parturition	27	49
9. Diseases of Locomotor System	24	37
10. Diseases of Integumentary System.....	29	24
VII.—Violence :		
1 Accident or Negligence	313	346
2. Homicide	7	7
3. Suicide	56	40
4. Execution :—Hanging .....	...	...
VIII.—Ill-defined and not Specified Causes...	916	903
TOTAL	11,493	12,115

TABLE C.—MANCHESTER, 1898.

CAUSES OF DEATHS AT DIFFERENT LIFE PERIODS—MALES.

Classes	CAUSES OF DEATH	All Ages Total	AGES AT DEATH—IN YEARS												
			UNDER 5 YEARS		5	10	15	20	25	35	45	55	65	75	85 and upwards
			0 to 1	1 to 5	to 10	to 15	to 20	to 25	to 35	to 45	to 55	to 65	to 75	to 85	
	All Causes.....	5978	1874	808	120	62	92	126	341	565	629	675	472	192	22
I.	Smallpox .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Measles	146	32	109	4	1	...	...	...	...	...	...	...	...	...
	Scarlet Fever	30	3	18	8	...	...	1	...	...	...	...	...	...	...
	Typhus Fever.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Whooping Cough	75	37	36	2	...	...	...	...	...	...	...	...	...	...
	Diphtheria	25	4	13	5	...	...	2	1	...	...	...	...	...	...
	Membranous Croup	3	...	2	1	...	...	...	...	...	...	...	...	...	...
	Ill-defined Fever.....	2	...	...	...	...	1	...	...	1	...	...	...	...	...
	Enteric Fever	62	...	2	3	7	11	17	14	5	2	...	1	...	...
	Influenza	32	2	1	1	1	3	3	4	4	5	3	4	1	...
	Simple Cholera	21	10	2	1	...	...	...	1	3	...	3	1	...	...
	Diarrhœa, Dysentery.....	534	405	103	3	...	1	...	1	...	7	4	5	5	...
	Venereal Affections.....	45	24	1	...	...	...	1	1	5	6	3	3	1	...
	Erysipelas	14	1	1	...	1	...	...	...	4	2	3	2	...	...
	Pyæmia	3	...	...	2	1	...	...	...	...	...	...	...	...	...
	Puerperal Fever .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Other Zymotics	5	...	3	1	...	...	1	...	...	...	...	...	...	...
II.	Parasitic Diseases	2	1	1	...	...	...	...	...	...	...	...	...	...	...
III.	Dietetic Diseases, Intemperance	37	...	...	...	...	...	...	6	15	8	7	1	...	...
IV.	Rheumatic Fever.....	26	...	...	2	2	3	2	4	5	3	3	2	...	...
	Rickets	18	9	9	...	...	...	...	...	...	...	...	...	...	...
	Cancer	164	...	...	1	1	...	...	6	19	39	61	29	8	...
	Tabes Mesenterica.....	54	27	24	1	1	...	...	1	...	...	...	...	...	...
	Hydrocephalus	93	23	50	15	2	1	1	...	1	...	...	...	...	...
	Phthisis.....	642	4	7	7	10	26	45	132	170	145	68	26	2	...
	Scrofula, Tuberculosis	115	34	41	8	4	6	2	6	4	5	4	1	...	...
V.	Constitutional Diseases (other)...	47	2	1	1	2	1	4	7	6	6	9	6	2	...
	Premature Birth.....	194	194	...	...	...	...	...	...	...	...	...	...	...	...
	Malform. Develop. Dis. (other).. Old Age	48 88	46 ...	... ...	1 ...	1 ...	... ...	... ...	... ...	... ...	... ...	... 6	... 25	... 49	... 8
VI.	Apoplexy, Hemiplegia	178	2	1	1	...	...	...	...	13	35	55	59	10	2
	Epilepsy	17	...	...	2	1	...	...	2	6	3	1	2	...	...
	Convulsions	120	103	15	2	...	...	...	...	...	...	...	...	...	...
	Brain and Nervous Dis. (other)...	207	39	52	4	1	3	1	13	26	22	30	13	3	...
	Heart Diseases	495	10	6	5	7	7	10	37	55	90	144	85	36	3
	Croup	3	...	2	1	...	...	...	...	...	...	...	...	...	...
	Bronchitis	485	166	49	...	...	2	...	4	28	41	75	78	37	5
	Pneumonia	681	145	142	16	7	10	13	54	96	89	67	32	10	...
	Respiratory Diseases (other).....	67	10	14	1	...	...	1	2	10	11	8	8	2	...
	Digestive Organs (Diseases of)...	275	111	38	4	3	6	4	6	31	24	29	16	1	2
	Urinary Organs (Diseases of) ...	162	1	8	1	...	...	2	12	18	30	45	34	11	...
VII.	Reproductive Organs (Dis. of)...	2	...	...	...	...	...	...	...	...	...	1	...	...	1
	Local Diseases (other)	47	9	7	3	3	2	3	2	5	3	7	2	1	...
	Violence	230	34	21	12	6	9	12	22	28	39	22	19	5	1
	Marasmus, Atrophy	366	332	20	1	...	...	...	...	...	1	3	4	5	...
VIII. {	Other Ill-defined Causes	118	54	9	...	...	...	1	3	7	13	14	14	3	...

TABLE D.—MANCHESTER, 1898.
CAUSES OF DEATHS AT DIFFERENT LIFE PERIODS—FEMALES.

Classes	CAUSES OF DEATH	All Ages Total	AGES AT DEATH—IN YEARS												
			UNDER 5 YEARS		5 to 10	10 to 15	15 to 20	20 to 25	25 to 35	35 to 45	45 to 55	55 to 65	65 to 75	75 to 85	85 and upwards
			0 to 1	1 to 5											
	All Causes	5515	1551	770	142	75	97	138	336	485	496	566	545	271	43
I.	Smallpox .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Measles.....	125	15	102	7	1	...	...	...	...	...	...	...	...	...
	Scarlet Fever	35	1	22	6	2	4	...	...	...	...	...	...	...	...
	Typhus Fever.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Whooping Cough	95	29	63	3	...	...	...	...	...	...	...	...	...	...
	Diphtheria	16	3	4	6	2	1	...	...	...	...	...	...	...	...
	Membranous Croup	7	...	6	1	...	...	...	...	...	...	...	...	...	...
	Ill-defined Fever.....	1	1	...	...	...	...	...	...	...	...	...	...	...	...
	Enteric Fever	58	...	1	4	5	9	8	19	10	2	...	...	...	...
	Influenza	32	...	1	2	...	...	1	7	5	6	5	3	2	...
	Simple Cholera	9	5	2	1	...	...	...	...	...	...	...	1	...	...
	Diarrhœa, Dysentery.....	526	390	102	4	...	...	1	2	2	4	5	11	5	...
	Venereal Affections.....	18	15	1	...	...	...	1	1	...	...	...	...	...	...
	Erysipelas.....	9	1	1	...	...	...	...	2	...	1	1	1	2	...
	Pyæmia.....	5	1	...	...	...	...	1	...	2	1	...	...	...	...
	Puerperal Fever	30	...	...	...	...	1	7	13	8	1	...	...	...	...
	Other Zymotics .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...
II.	Parasitic Diseases	4	4	...	...	...	...	...	...	...	...	...	...	...	...
III.	Dietetic Diseases, Intemperance	16	1	...	...	...	...	...	1	5	6	2	1	...	...
IV.	Rheumatic Fever	21	...	1	4	3	3	5	4	1	...	...	...	...	...
	Rickets	15	6	9	...	...	...	...	...	...	...	...	...	...	...
	Cancer	230	...	1	...	1	2	2	15	30	62	64	41	12	...
	Tabes Mesenterica	51	31	19	...	...	...	...	1	...	...	...	...	...	...
	Hydrocephalus	70	20	38	8	2	...	...	2	...	...	...	...	...	...
	Phthisis.....	414	5	8	13	11	31	41	91	119	59	28	7	1	...
	Scrofula, Tuberculosis	86	23	24	11	7	4	4	5	5	...	1	2	...	...
V.	Constitutional Diseases (other)...	67	2	1	...	2	3	3	13	11	7	13	8	2	2
	Premature Birth	179	179	...	...	...	...	...	...	...	...	...	...	...	...
	Malform. Develop. Dis. (other).. Old Age	46 131	44 ...	1 ...	1 ...	...	...	...	...	...	...	6 51	59 15	...	...
VI.	Apoplexy, Hemiplegia	217	...	2	...	...	1	...	3	17	30	73	70	20	1
	Epilepsy	16	...	...	1	1	...	5	5	2	1	...	1	...	...
	Convulsions	89	69	18	1	...	...	...	...	1	...	...	...	...	...
	Brain and Nervous Dis. (other)...	204	33	27	10	5	3	5	15	20	25	20	27	12	2
	Heart Diseases	556	4	2	11	18	12	13	33	84	101	109	109	49	11
	Croup	2	...	1	1	...	...	...	...	...	...	...	...	...	...
	Bronchitis.....	496	111	53	6	...	2	2	8	21	56	75	95	58	9
	Pneumonia	507	120	149	19	4	7	12	28	39	42	51	27	8	1
	Respiratory Diseases (other).....	70	13	7	2	...	1	2	5	8	4	11	11	5	1
	Digestive Organs (Diseases of)...	269	79	33	3	4	5	7	15	34	27	27	27	8	...
	Urinary Organs (Diseases of) ...	130	1	6	2	2	4	7	15	21	30	23	16	3	...
	Reproductive Organs (Dis. of)...	49	...	...	...	...	1	5	23	12	4	2	2	...	...
	Local Diseases (other)	36	3	4	4	2	...	1	3	4	4	7	2	2	...
VII.	Violence	146	40	29	11	2	3	5	6	12	10	17	8	3	...
VIII.	Marasmus, Atrophy	311	257	24	...	...	...	...	...	...	2	4	10	13	1
	Other Ill-defined Causes	121	45	8	...	1	...	...	1	12	11	22	14	7	...

TABLE E.
CITY OF MANCHESTER, 1898.—CAUSES OF DEATH IN INFANCY AND
CHILDHOOD.

CAUSES OF DEATH	UNDER ONE YEAR			Total under One Year	ONE AND UNDER FIVE YEARS				Total under Five Years
	Under 3 months	3-6 months	6-12 months		1-	2-	3-	4-	
All Causes	1,515	747	1,163	3,425	958	339	168	113	5,003
Measles	4	3	40	47	108	58	33	12	258
Scarlatina .....	...	1	3	4	12	11	12	5	44
Whooping Cough	8	16	42	66	56	23	13	7	165
Diphtheria..... (Memb: Croup)	1	...	6	7	6	8	4	7	32
Fever (various forms) .....	...	...	1	1	1	1	...	1	4
Diarrhoea	197	258	340	795	177	18	6	4	1,000
Syphilis	27	11	1	39	1	1	...	...	41
Tabes Mesenterica	9	20	29	58	34	8	1	...	101
Hydrocephalus	6	11	26	43	52	20	6	10	131
Scrofula (other).....	13	18	35	66	46	14	11	9	146
Premature Birth	364	6	3	373	...	...	...	...	373
Convulsions	108	23	41	172	23	7	1	2	205
Brain Diseases (other)	7	21	46	74	41	19	12	10	156
Lung Diseases	135	130	300	565	256	97	40	24	982
Teething .....	...	8	41	49	23	5	1	...	78
Atrophy, Marasmus	370	117	102	589	33	5	4	2	633
Found Dead in Bed.....	70	23	8	*101	1	1	...	...	103
Suffocation	5	...	...	5	...	...	...	...	5
Violence (other forms)	4	2	2	8	15	11	11	13	58
Ill-defined Causes.....	25	13	21	59	12	3	...	...	74
Unclassified	162	66	76	304	61	29	13	7	414

* 61 of these were "Found dead in bed, suffocated."

TABLE F, 1871 TO 1898.—MANCHESTER.—ESTIMATED POPULATIONS. ANNUAL RATES OF MARRIAGES, BIRTHS, AND DEATHS (a) from all causes, and (b) from specified causes; also the percentages to total deaths of Inquest Cases, and of Deaths in Public Institutions.

YEARS	Estimated Populations — (Mean)	Persons Married	ANNUAL RATES PER 1,000 PERSONS LIVING											PERCENTAGES TO TOTAL DEATHS		YEARS		
			Deaths (All Causes)	Smallpox	Measles	Scarlet Fever	Diphtheria	Whooping Cough	Typhus Fever	Enteric Fever	Simple Continued Fever	Diarrhea and Dysentery	English Cholera	Violence	Inquest Cases		Deaths in Public Institutions	
Quinquennial Averages	1871-75	24.6	38.9	28.3	0.26	0.64	1.08	0.08	0.78	0.14	0.43	0.21	1.92	0.03	0.94	7.2	13.4	1871-75
	1876-80	18.6	38.7	26.2	0.24	0.53	1.07	0.13	0.84	0.08	0.29	0.11	1.22	0.04	0.89	7.5	14.3	1876-80
	1881-85	17.9	35.1	23.6	0.04	0.71	0.48	0.10	0.68	0.05	0.20	0.03	0.96	0.03	0.72	7.0	15.9	1881-85
	1886-90	16.6	33.4	24.6	0.02	0.83	0.50	0.32	0.54	0.02	0.30	0.01	1.06	0.02	0.78	6.9	17.7	1886-90
	1891-95	16.9	33.2	23.6	0.03	0.62	0.26	0.27	0.64	0.00	0.24	0.01	1.14	0.05	0.77	7.1	19.2	1891-95
Ave. 25 yrs.	1871-95	18.9	35.8	25.3	0.11	0.66	0.68	0.18	0.70	0.06	0.29	0.07	1.26	0.03	0.82	7.1	16.1	1871-95 Ave. 25 yrs.
1871	464,866	24.2	38.1	29.3	0.72	0.84	0.71	0.04	0.61	0.20	0.45	0.35	2.58	0.02	0.90	6.3	13.7	1871
1872	471,023	25.8	39.3	27.3	0.32	0.33	1.02	0.09	1.22	0.17	0.40	0.17	2.07	0.04	0.90	6.9	13.5	1872
1873*	477,251	24.8	38.3	28.0	0.08	0.85	1.43	0.05	0.38	0.15	0.46	0.20	1.92	0.05	0.83	7.3	12.8	1873*
1874	483,582	23.8	39.3	28.7	0.05	0.62	1.33	0.07	0.83	0.08	0.39	0.19	1.71	0.01	0.94	7.3	13.5	1874
1875	489,987	24.2	39.5	28.4	0.11	0.54	0.92	0.14	0.88	0.11	0.44	0.12	1.32	0.01	1.12	8.4	13.3	1875
1876	496,476	20.2	40.0	28.0	0.80	0.65	1.13	0.10	0.81	0.16	0.42	0.17	1.50	0.02	1.05	7.4	14.4	1876
1877	503,051	19.8	39.5	26.1	0.36	0.59	1.05	0.13	0.84	0.11	0.29	0.12	0.82	0.01	0.86	7.9	14.9	1877
1878	509,714	18.8	39.7	26.8	0.01	0.45	1.07	0.14	0.68	0.06	0.31	0.10	1.42	0.07	0.91	7.6	14.4	1878
1879*	516,464	16.8	37.3	25.2	0.00	0.35	1.07	0.13	1.09	0.02	0.18	0.07	0.62	0.01	0.81	7.3	14.2	1879*
1880	523,304	17.2	36.9	25.0	0.01	0.63	1.03	0.14	0.76	0.04	0.26	0.07	1.73	0.09	0.80	7.1	13.7	1880
1881	530,051	17.8	35.9	22.8	0.03	0.29	0.34	0.09	0.71	0.03	0.17	0.06	0.73	0.02	0.84	8.1	15.9	1881
1882	536,324	18.8	35.7	24.0	0.05	0.89	0.34	0.11	0.87	0.10	0.25	0.04	1.00	0.03	0.67	7.2	14.5	1882
1883	542,671	17.8	34.9	24.4	0.01	0.71	0.81	0.11	0.62	0.05	0.20	0.03	0.95	0.03	0.73	7.0	15.5	1883
1884*	549,093	18.0	34.4	23.4	0.01	0.57	0.74	0.08	0.49	0.03	0.19	0.03	1.46	0.05	0.65	6.2	17.3	1884*
1885	555,591	17.0	34.8	23.6	0.08	1.08	0.17	0.10	0.71	0.04	0.17	0.01	0.64	0.02	0.69	6.4	16.4	1885
1886	562,166	16.4	34.7	24.1	0.00	0.27	0.41	0.15	0.57	0.03	0.29	0.01	1.34	0.04	0.71	7.2	17.0	1886
1887	568,819	16.6	33.9	25.4	0.01	1.54	0.63	0.23	0.50	0.02	0.31	0.01	1.19	0.02	0.77	6.9	16.1	1887
1888	575,550	16.0	33.3	23.3	0.07	0.27	0.42	0.36	0.79	0.02	0.33	0.02	0.71	0.01	0.74	6.7	18.3	1888
1889	582,362	17.0	33.1	24.2	0.00	1.22	0.45	0.51	0.45	0.01	0.31	0.01	1.00	0.03	0.89	6.5	18.2	1889
1890*	589,253	17.0	31.8	26.2	...	0.83	0.60	0.36	0.37	0.01	0.27	0.02	1.04	0.02	0.79	7.0	19.1	1890*
1891†	† 508,673	17.2	33.8	26.0	...	0.43	0.22	0.25	1.02	0.01	0.37	0.01	0.81	0.04	0.79	6.8	18.4	1891†
1892†	† 513,196	17.2	33.4	23.2	0.00	0.72	0.27	0.25	0.72	0.00	0.24	0.01	0.79	0.02	0.77	7.4	18.2	1892†
1893†	† 517,760	16.0	33.4	24.3	0.09	0.57	0.27	0.35	0.46	0.00	0.25	0.01	1.75	0.10	0.76	6.9	18.7	1893†
1894†	† 522,365	16.8	31.8	19.8	0.04	0.42	0.22	0.29	0.55	...	0.17	0.01	0.70	0.02	0.75	7.5	21.3	1894†
1895†	† 527,010	17.4	33.4	24.5	0.00	0.96	0.33	0.21	0.47	...	0.18	0.01	1.66	0.06	0.80	6.9	19.2	1895†
1896†*	† 531,697	18.3	32.8	22.0	...	1.05	0.37	0.15	0.66	0.00	0.22	0.01	1.04	0.02	0.71	7.4	19.7	1896†*
1897†	† 536,426	17.8	32.9	22.4	...	1.17	0.23	0.08	0.56	0.00	0.18	0.00	1.74	0.06	0.68	6.6	20.0	1897†
1898†	† 541,296	18.3	32.3	21.2	...	0.50	0.12	0.09	0.31	...	0.22	0.01	1.96	0.06	0.69	7.0	19.5	1898†

* The facts for these years are for 53 instead of 52 weeks; corrections have, therefore, been made in calculating the rates.
† The populations and rates for the years subsequent to 1890, except the marriage rates, relate to the City of Manchester as enlarged by the Act of that year. The facts and rates for previous years are those for the three Unions of Manchester, Chorlton, and Prestwich, which have been taken to approximately represent "Manchester."
‡ These figures include a proportion of the inmates of certain Extra-municipal Institutions which receive patients from the City of Manchester, and are therefore in excess of the estimates of the Registrar-General.

TABLE G, 1881 TO 1898. — MANCHESTER.
ANNUAL RATES OF MORTALITY FROM CERTAIN CAUSES OF DEATH.

YEAR		ANNUAL RATES PER 1,000 PERSONS LIVING										RATES PER 1,000 BIRTHS	
		Cancer	Tabes Mesenterica	Phthisis	Other Tuber: Diseases	Diseases of Nervous System	Diseases of Circulatory System	Diseases of Respiratory System	Diseases of Digestive System	Diseases of Urinary System	Diseases of Generative System	Puerperal Fever	Childbirth
Quinquennial Periods	1881-85	0.50	0.35	2.42	0.57	3.28	1.37	5.41	1.23	0.48	0.08	3.03	1.99
	1886-90	0.64	0.36	2.24	0.59	3.09	1.73	5.76	1.23	0.61	0.08	3.22	2.13
	1891-95	0.62	0.22	2.09	0.75	2.50	1.75	5.56	1.07	0.52	0.07	2.75	3.42
Average 15 years	1881-95	0.58	0.31	2.25	0.63	2.96	1.61	5.58	1.18	0.54	0.08	3.00	2.52
	1881	0.48	0.28	2.46	0.52	3.33	1.19	5.57	1.24	0.39	0.07	3.15	1.37
	1882	0.44	0.40	2.41	0.61	3.35	1.34	5.33	1.19	0.45	0.08	3.92	1.62
	1883	0.54	0.34	2.54	0.59	3.32	1.33	5.66	1.20	0.50	0.06	2.27	1.58
	1884*	0.51	0.39	2.34	0.56	3.27	1.44	4.88	1.23	0.59	0.10	2.81	2.55
	1885	0.51	0.36	2.34	0.56	3.12	1.53	5.59	1.28	0.49	0.08	3.05	2.84
	1886	0.56	0.43	2.44	0.59	3.30	1.53	5.43	1.26	0.57	0.08	2.67	1.85
	1887	0.62	0.39	2.19	0.53	3.17	1.66	5.72	1.23	0.53	0.08	3.58	1.35
	1888	0.65	0.31	2.14	0.62	3.19	1.72	5.31	1.16	0.62	0.10	4.12	1.77
	1889	0.70	0.36	2.12	0.59	2.94	1.79	5.06	1.28	0.64	0.08	3.06	1.87
	1890*	0.65	0.33	2.33	0.62	2.87	1.93	7.28	1.22	0.66	0.08	2.68	3.89
	1891†	0.63	0.25	2.20	0.78	3.10	1.89	6.77	1.03	0.55	0.07	3.08	4.01
	1892†	0.61	0.21	2.05	0.75	2.44	1.84	5.44	1.14	0.53	0.05	3.79	4.54
	1893†	0.59	0.26	2.05	0.76	2.51	1.66	5.53	1.20	0.53	0.07	3.70	3.94
	1894†	0.66	0.18	1.97	0.67	2.19	1.58	4.35	0.96	0.49	0.04	1.93	2.77
	1895†	0.63	0.22	2.16	0.77	2.28	1.79	5.73	1.04	0.49	0.11	1.25	1.82
	*1896†	0.66	0.13	2.00	0.60	2.02	1.75	5.19	1.04	0.46	0.11	0.96	1.47
	1897†	0.74	0.22	2.12	0.67	2.02	1.74	4.51	1.03	0.51	0.10	2.10	1.36
	1898†	0.73	0.19	1.95	0.67	1.94	1.94	4.27	1.00	0.54	0.09	1.72	1.54

* The facts for these years are for 53 instead of 52 weeks; corrections have therefore been made in calculating the rates.

† The rates of mortality for the years subsequent to 1890 refer to the City of Manchester as enlarged by the Act of that year. The rates for 1890 and for previous years are those for the three Unions of Manchester, Chorlton, and Prestwich, which have been taken to approximately represent "Manchester."

TABLE H, 1898.—POPULATION, AREA, DENSITY. TOTAL BIRTHS AND DEATHS,
WITH BIRTH AND DEATH RATES.

[INSTITUTION POPULATIONS, BIRTHS AND DEATHS, DISTRIBUTED.]

STATISTICAL DIVISIONS	Estimated Population	Area in Acres	Persons to an Acre	BIRTHS		DEATHS	
				Total	Rate per 1,000	Total	Rate per 1,000
City of Manchester	541,296	12,788	42	17,486	32'30	11,493	21'23
I. Manchester Township..	145,208	1,646	88	4,906	33'79	3,740	25'76
II. North Manchester	144,879	7,191	20	4,876	33'66	2,708	18'69
III. South Manchester	251,209	3,951	64	7,703	30'66	5,045	20'09
I. { Ancoats	45,488	400	114	1,765	38'80	1,234	27'13
{ Central	35,845	748	48	984	27'45	893	24'91
{ St. George's.....	63,875	498	128	2,158	33'78	1,613	25'25
II. { Cheetham	31,355	919	34	1,106	35'27	478	15'24
{ Crumpsall	9,916	733	14	196	19'77	110	11'09
{ Blackley	8,162	1,840	4	204	24'99	142	17'40
{ Harpurhey	12,529	193	65	515	41'10	268	21'39
{ Moston	6,833	1,297	5	255	37'32	144	21'07
{ Newton Heath	37,527	1,350	28	1,164	31'02	720	19'19
{ Bradford	23,337	288	81	843	36'12	523	22'41
{ Beswick	10,976	96	114	382	34'80	227	20'68
{ Clayton	4,244	475	9	211	49'72	96	22'62
III. { Ardwick	37,817	509	74	1,394	36'86	801	21'18
{ Openshaw	31,961	581	55	923	28'88	536	16'77
{ West Gorton	28,130	342	82	953	33'88	565	20'09
{ Rusholme and Kirk. ...	19,830	1,396	14	549	27'69	337	16'99
{ Chorlton-upon-Medlock	61,851	646	96	1,496	24'19	1,169	18'90
{ Hulme.....	71,620	477	150	2,388	33'34	1,637	22'86

TABLE J, 1898.

BIRTHS REGISTERED IN THE CITY OF MANCHESTER, IN ITS MAIN DIVISIONS
AND IN DISTRICTS; DISTINGUISHING LEGITIMATE AND ILLEGITIMATE BIRTHS;
ALSO THE PROPORTION OF MORTALITY AMONG INFANTS OF BOTH CLASSES UNDER
ONE YEAR OF AGE.

STATISTICAL DIVISIONS	BIRTHS		Percentage of Illegitimate Births to Total Births	DEATHS UNDER 1 YEAR		PROPORTION OF DEATHS UNDER 1 YEAR PER 1,000 BIRTHS		
	Total	Illegitimate		Total	Of Illegitimate Children	Total	Legitimate	Illegitimate
City of Manchester.....	17,486	705	4.03	3,425	283	196	187	401
I. Manchester Township	4,907	245	4.99	1,072	104	218	208	424
II. North Manchester... ..	4,876	132	2.71	801	52	164	158	394
III. South Manchester	7,703	328	4.26	1,552	127	201	193	387
I. { Ancoats	1,765	67	3.80	367	30	208	199	448
Central	984	87	8.85	249	31	253	243	356
St. George's	2,158	91	4.22	456	43	211	200	473
II. { Cheetham	1,106	29	2.62	135	11	122	115	379
Crumpsall	196	6	3.06	28	2	143	137	333
Blackley.....	204	4	1.96	25	1	123	120	250
Harpurhey.....	515	18	3.49	89	10	173	159	556
Moston	255	6	2.35	46	3	180	173	500
Newton Heath	1,164	32	2.75	201	11	173	168	344
Bradford	843	25	2.97	179	7	212	210	280
Beswick	382	5	1.31	59	2	154	151	400
Clayton	211	7	3.32	39	5	185	167	714
III. { Ardwick	1,394	46	3.30	286	21	205	197	457
Openshaw	923	17	1.84	203	10	220	213	588
Gorton (West)	953	30	3.15	207	10	217	213	333
Rusholme and Kirk.	549	25	4.55	98	8	179	172	320
Chorlton-on-Medlock	1,496	104	6.95	288	43	193	176	413
Hulme	2,388	106	4.44	470	35	197	191	330

TABLE K, 1898.

INFANTILE MORTALITY IN THE CITY, AND ITS THREE MAIN
DIVISIONS.

DEATH-RATES UNDER ONE YEAR PER 1,000 BIRTHS.

CAUSES OF DEATH	City of Manchester	Manchester Township	North Manchester	South Manchester
All Causes	195·87	218·46	164·27	201·48
Measles	2·69	2·85	3·08	2·34
Whooping Cough	3·77	3·46	1·85	5·19
Other Com: Infectious Diseases†	0·69	0·82	1·03	0·39
Diarrhœa	45·46	53·60	36·51	45·96
Tubercular Diseases‡	9·55	8·97	5·74	12·33
Convulsions	9·84	10·80	6·77	11·16
Other Nervous Diseases§	4·23	4·48	4·10	4·15
Lung Diseases	32·31	35·26	29·94	31·94
Wasting Diseases ||.....	55·02	59·51	49·43	55·69
Suffocation	0·29	0·61	0·21	0·13
Found dead in bed	5·78	7·54	4·51	5·45

† These are Smallpox, Scarlatina, Diphtheria, Membranous Croup, and various forms of “Fever,” including the chief forms of Typhus and Typhoid.

‡ These are Phthisis, Tubercular Meningitis (Hydrocephalus), Tabes Mesenterica, and General Tuberculosis (Scrofula).

§ These are Meningitis, and other diseases of the Brain and Spinal Cord.

|| These are Premature Birth, and such ill-defined causes as Atrophy, Marasmus, Debility, Inanition, &c.

TABLE L, 1898.—CITY OF MANCHESTER. ANNUAL RATES OF MORTALITY PER 1,000 PERSONS LIVING AT ALL AGES, IN THE CITY OF MANCHESTER AND IN ITS STATISTICAL DIVISIONS, FROM CERTAIN DISEASES AND GROUPS OF DISEASES.

CAUSES OF DEATH	City of Manchester	Manchester Township	North Manchester	South Manchester	City of Manchester Average of 6 years 1891-97
All Causes	21·23	25·76	18·69	20·09	23·15
Smallpox .....	...	...	...	...	0·02
Measles	0·50	0·48	0·56	0·48	0·76
Scarlet Fever	0·12	0·11	0·12	0·12	0·27
Typhus Fever .....	...	...	...	...	...
Whooping Cough	0·31	0·41	0·14	0·36	0·63
Diphtheria, Membranous Croup	0·09	0·06	0·15	0·08	0·23
Ill-defined Fever.....	0·01	0·01	0·01	...	0·01
Enteric Fever	0·22	0·25	0·24	0·19	0·23
Influenza	0·12	0·08	0·16	0·12	0·28
Diarrhœa, Dysentery	1·96	2·58	1·62	1·79	1·21
Erysipelas	0·04	0·02	0·05	0·05	0·05
Pyæmia	0·01	0·02	0·01	0·02	0·02
Puerperal Fever	0·06	0·04	0·07	0·06	0·08
Rheumatic Fever	0·09	0·08	0·11	0·08	0·07
Rickets	0·06	0·06	0·06	0·07	0·07
Cancer	0·73	0·81	0·70	0·69	0·65
Tabes Mesenterica.....	0·19	0·25	0·16	0·18	0·21
Hydrocephalus	0·30	0·23	0·26	0·37	0·33
Phthisis	1·95	3·02	1·33	1·69	2·08
Scrofula, Tuberculosis	0·37	0·45	0·21	0·42	0·38
Premature Birth	0·69	0·69	0·68	0·69	0·58
Old Age	0·40	0·48	0·43	0·35	0·48
Brain and Nervous Diseases ...	1·94	1·94	1·97	1·91	2·37
Heart Diseases	1·94	2·18	1·70	1·94	1·75
Bronchitis	1·81	2·13	1·55	1·78	2·53
Pneumonia	2·19	3·03	1·88	1·89	2·43
Respiratory Diseases (other) ...	0·26	0·35	0·18	0·26	0·40
Digestive Organs (Diseases of)	1·00	1·14	0·84	1·02	1·06
Urinary Organs (Diseases of)	0·54	0·55	0·49	0·56	0·51

TABLE M, 1898.—CITY OF MANCHESTER.—ANNUAL RATES OF MORTALITY AT SIX GROUPS OF AGES, * PER 1,000 LIVING AT

THOSE AGE GROUPS, FROM CERTAIN PREVALENT DISEASES, AND GROUPS OF DISEASES.

CAUSES OF DEATH	Under 5 Years	5 to 15 Years	15 to 25 Years	25 to 45 Years	45 to 65 Years	Over 65 Years
All Causes	73·67	3·30	4·14	11·02	32·66	111·54
Smallpox .....	...	...	...	...	...	...
Measles	3·80	0·11	...	...	...	...
Scarlatina	0·65	0·13	0·05	...	...	...
Diphtheria, Memb. Croup.....	0·47	0·12	0·03	0·01	...	...
Whooping Cough	2·43	0·04	...	...	...	...
Fever { Typhus .....	...	...	...	...	...	...
	0·04	0·16	0·41	0·31	0·06	0·07
	0·01	...	0·01	0·01	...	...
Diarrhoeal Diseases.....	15·00	0·07	0·02	0·06	0·32	2·02
Tubercular Diseases	5·57	0·83	1·47	3·43	4·28	2·82
Diseases of ... { Brain	5·32	0·24	0·16	0·78	4·07	16·03
	0·32	0·34	0·38	1·33	6·13	21·15
	14·46	0·47	0·48	1·93	7·32	27·94
	3·84	0·12	0·20	0·55	1·48	3·90
Urinary System	0·24	0·04	0·12	0·42	1·77	4·62
Other Diseases	21·51	0·63	0·81	2·20	7·25	32·99

* For death-rates at all ages, see Table L

TABLE N, 1898.—ANNUAL RATES OF MORTALITY IN STATISTICAL DIVISIONS, AT SIX GROUPS OF AGES,* PER 1,000 LIVING AT THOSE AGE GROUPS, FROM CERTAIN PREVALENT DISEASES, AND GROUPS OF DISEASES.

CAUSES OF DEATH	Under 5 Years			5 to 15 Years			15 to 25 Years		
	Manchester Township	North Manchester	South Manchester	Manchester Township	North Manchester	South Manchester	Manchester Township	North Manchester	South Manchester
All Causes	88·65	62·52	71·70	3·74	3·22	3·09	4·39	4·84	3·59
Smallpox .....	...	...	...	...	...	...	...	...	...
Measles.....	3·75	3·96	3·73	0·06	0·18	0·09	...	...	...
Scarlatina	0·61	0·79	0·58	0·13	0·03	0·20	0·03	0·07	0·04
Diphtheria, Memb. Croup	0·39	0·74	0·36	0·06	0·24	0·09	...	...	0·06
Whooping Cough.....	3·20	1·00	2·86	0·06	0·03	0·04	...	...	...
Fever..... {	Typhus.....	...	...	...	...	...	...	...	...
	Enteric	0·11	0·05	...	0·13	0·21	0·14	0·35	0·51
	Continued.....	...	0·05	...	...	...	0·03	...	...
Diarrhœal Diseases.....	19·72	11·87	14·15	0·16	0·03	0·05	0·07	...	...
Tubercular Diseases	5·29	3·75	6·85	1·04	0·59	0·85	1·62	1·52	1·36
Diseases of {	Brain.....	5·95	5·07	5·10	0·16	0·33	0·23	0·14	0·30
	Heart	0·22	0·21	0·45	0·53	0·30	0·25	0·35	0·61
	Lungs	18·90	12·45	13·08	0·66	0·35	0·43	0·55	0·47
	Digestive System ...	5·07	3·11	3·57	0·03	0·12	0·16	0·14	0·27
Other Diseases.....	Urinary System.....	0·11	0·37	0·23	0·03	0·12	...	0·21	0·10
		25·34	19·10	20·74	0·69	0·71	0·54	0·90	0·98

CAUSES OF DEATH	25 to 45 Years			45 to 65 Years			Over 65 Years		
	Manchester Township	North Manchester	South Manchester	Manchester Township	North Manchester	South Manchester	Manchester Township	North Manchester	South Manchester
All Causes	15·13	9·19	9·67	40·82	27·16	30·66	117·07	111·70	108·64
Smallpox .....	...	...	...	...	...	...	...	...	...
Measles.....	...	...	...	...	...	...	...	...	...
Scarlatina .....	...	...	...	...	...	...	...	...	...
Diphtheria, Memb. Croup.....	...	...	0·01	...	...	...	...	...	...
Whooping Cough .....	...	...	...	...	...	...	...	...	...
Fever..... {	Typhus.....	...	...	...	...	...	...	...	...
	Enteric	0·45	0·27	0·24	0·05	0·05	0·06	0·29	...
	Continued	0·02	...	...	...	...	...	...	...
Diarrhœal Diseases.....	0·14	0·02	0·03	0·63	0·11	0·24	0·58	3·06	2·21
Tubercular Diseases	5·37	2·38	2·89	7·30	2·57	3·36	5·77	1·11	2·21
Diseases of {	Brain.....	0·85	0·91	0·68	3·99	4·00	4·16	13·55	16·43
	Heart	1·89	0·96	1·22	6·81	5·48	6·07	19·03	20·89
	Lungs.....	2·53	1·82	1·65	10·02	5·31	6·75	31·14	25·07
	Digestive System....	0·76	0·39	0·50	1·46	0·93	1·78	2·02	4·74
Other Diseases.....	Urinary System.....	0·38	0·47	0·42	1·90	1·48	1·84	4·61	3·06
		2·74	1·97	2·01	8·66	7·23	6·39	40·08	37·33

* For death-rates at all ages, see Table L.

TABLE O, 1898

MANCHESTER.—CERTIFICATION OF THE CAUSES OF DEATH IN THE MAIN
DIVISIONS AND IN DISTRICTS.

STATISTICAL DIVISIONS.	Total Deaths	Certified by		Not Certified	Proportion per cent. of Deaths		
		Registered Medical Practitioners	Coroner		Certified by		Not Certified
					Regist'd Medical Prac- titioners	Coroner	
City of Manchester	11,493	10,592	803	98	92·0	7·2	0·8
I. Manchester Township ...	3,740	3,397	307	36	90·8	8·2	1·0
II. North Manchester	2,708	2,510	182	16	92·7	6·7	0·6
III. South Manchester	5,045	4,685	314	46	92·9	6·2	0·9
I. { Ancoats	1,234	1,132	88	14	91·8	7·1	1·1
{ Central	893	804	84	5	90·1	9·4	0·5
{ St. George's	1,613	1,461	135	17	90·5	8·4	1·1
II. { Cheetham	478	441	30	7	92·3	6·3	1·4
{ Crumpsall ..	110	98	12	...	89·1	10·9	...
{ Blackley	142	136	6	...	95·8	4·2	...
{ Harpurhey	268	251	16	1	93·6	6·0	0·4
{ Moston	144	128	14	2	88·9	9·7	1·4
{ Newton Heath	720	662	55	3	92·0	7·6	0·4
{ Bradford	523	491	30	2	93·9	5·7	0·4
{ Beswick	227	214	12	1	94·3	5·3	0·4
{ Clayton	96	89	7	...	92·7	7·3	...
III. { Ardwick	801	740	53	8	92·4	6·6	1·0
{ Openshaw	536	511	23	2	95·3	4·3	0·4
{ Gorton (West)	565	524	31	10	92·7	5·5	1·8
{ Rusholme and Kirk. ...	337	316	19	2	93·8	5·6	0·6
{ Chorlton-upon-Medlock	1,169	1,095	63	11	93·7	5·4	0·9
{ Hulme	1,637	1,499	125	13	91·6	7·6	0·8

TABLE P, 1898.—PARTICULARS AS TO MANCHESTER PATIENTS UNDER TREATMENT IN THE SEVERAL FEVER HOSPITALS DURING THE YEAR; ALSO OF PATIENTS FROM OUTSIDE DISTRICTS SENT TO MONSALL AND CLAYTON DURING THE SAME PERIOD.

DISEASE	HOSPITAL	In Hospital commence- ment of year	Admitted	Discharged	Died	Remaining in Hospital close of year
SMALLPOX	Clayton Hospital .....	...	...	...	...	...
	Total .....	...	...	...	...	...
SCARLET FEVER ...	Monsall	316	670	836	47	103
	Other Hospitals.....	...	2	1	1	...
	Total	316	672	837	48	103
DIPHThERIA	Monsall	2	76	47	14	17
	Other Hospitals .....	...	...	...	...	...
	Total	2	76	47	14	17
ENTERIC FEVER...	Monsall	66	364	299	54	77
	Other Hospitals	4	23	14	6	7
	Total	70	387	313	60	84
TYPHUS FEVER ...	Monsall .....	...	...	...	...	...
	Other Hospitals .....	...	...	...	...	...
	Total .....	...	...	...	...	...
OTHER ACUTE DISEASES	Monsall	7	147	131	13	10
	Other Hospitals .....	...	...	...	...	...
	Total	7	147	131	13	10
ALL DISEASES.....		395	1,282	1,328	135	214

PATIENTS SENT TO MONSALL, FROM DISTRICTS OUTSIDE THE CITY, DURING THE YEAR 1898.

DISEASE	Withing- ton	Stretford	Moss Side	Swinton,&c.	Sale	Prestwich	Gorton	Failsworth	Other Districts
Smallpox .....	...	...	...	...	...	...	...	...	...
Scarlatina	41	10	27	4	13	30	13	...	1
Diphtheria	3	2	1	1	1	2	...	...	...
Enteric Fever	10	2	9	1	...	...	17	9	...
Other Diseases.....	...	1	3	...	2	...	...	...	...

Total, 203.

TABLE Q, 1898.—WORK OF SANITARY DEPARTMENT FOR THE YEAR.

	TOWNSHIPS																	TOTAL	
	Ancoats	Central	St. George's	Cheetham	Crumpsall	Blackley	Harpurhey	Moston	Newton	Bradford	Beswick	Clayton	Ardwick	Openshaw	Gorton (West)	Rusholme and Kirkmanshulme	Chorlton-upon- Medlock		Hulme
Complaints to Sanitary Superintendent ...	685	1,260	1,158	722	33	30	24	79	486	78	73	9	249	125	216	101	497	1,396	17,200
Dwelling-houses	5,024	4,189	5,742	3,254	2,166	433	512	446	2,781	1,472	718	2,162	1,879	2,311	2,317	682	3,729	5,205	45,022
Newly-infected Dwelling-houses	130	121	156	142	42	21	47	22	141	88	39	10	122	123	123	74	145	208	1,754
Cellars.....	7	...	35	...	...	...	...	...	...	...	...	...	...	4	...	1	...	9	56
Schools	61	18	26	29	23	11	1	8	39	39	5	1	33	81	27	19	58	44	523
Factories and Workshops	63	505	58	24	16	2	6	6	85	9	1	...	5	26	22	2	18	7	855
Lodging-houses	192	165	513	227	22	...	...	...	37	78	33	...	38	...	19	17	258	177	1,776
Offensive Trades	68	47	57	21	26	17	15	11	107	22	12	29	128	41	18	10	51	26	706
Dairies and Milkshops.....	142	130	115	317	88	41	16	43	218	50	29	137	137	44	110	141	137	111	1,996
Bakehouses	201	297	162	277	13	23	119	18	62	94	43	21	131	148	125	53	336	570	2,693
Canal Boats .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1,971
Slaughter-houses	7	1	1	...	6	1	...	...	8	...	...	...	...	1	4	24	...	...	53
Tips for Refuse.....	...	3	...	8	24	2	112	53	46	...	...	79	...	23	...	14	...	...	364
Miscellaneous Inspections	2,987	3,058	2,732	878	695	240	68	482	1,333	886	382	609	509	442	382	563	2,013	1,165	19,424
Factories and Workshops by Shop Hours, &c., Inspectors.....	1,254	6,063	1,124	2,015	15	61	98	10	220	132	69	42	479	296	288	281	1,777	1,388	15,612
Shops by Shop Hours, &c., Inspectors	278	779	384	478	1	48	137	1	74	93	63	27	252	151	137	177	559	590	4,229
Re-inspections of Infected Dwelling-houses	468	512	599	455	225	57	121	108	573	299	124	94	313	311	140	230	365	530	5,524
Rooms Fumigated after Infectious Disease	271	146	361	246	68	15	37	43	213	138	63	32	201	193	22	102	173	209	2,533
Drains Tested by Water	356	557	615	141	126	14	7	19	143	140	162	10	58	64	166	243	387	220	3,428
Smoke { Observations made	138	429	203	94	74	17	17	60	161	15	3	83	153	350	17	16	313	57	2,200
Abatement { Proceedings before Magistrates	7	23	3	1	2	1	...	3	7	4	1	13	8	9	8	4	26	10	130
FoodAdul- { Samples Collected for Analysis	201	129	173	84	12	10	36	20	111	88	64	22	184	112	101	37	160	197	*1,739
teration { Proceedings before Magistrates	7	12	3	3	...	...	2	...	3	3	...	...	11	4	1	1	1	15	66
Ashpits reported to Cleansing Department for emptying	15	9	2	28	940	107	55	165	256	86	1	563	...	307	304	131	92	232	3,293
Receptacles reported to Cleansing Department for emptying.....	177	194	116	700	19	5	19	...	16	17	131	...	23	20	6	39	129	113	1,724
Notices issued for Abatement of Nuisances.	1,230	1,281	1,697	1,372	147	131	134	96	537	200	138	134	489	572	522	236	1,352	827	11,095
Letters written for Abatement of Nuisances	133	66	129	75	2	9	4	2	37	22	2	15	19	22	48	7	67	33	692
Reports made to Medical Officer of Health	1,982	1,257	1,688	793	183	193	340	256	992	1,089	416	153	1,346	1,471	965	581	1,499	2,340	17,574
Legal proceedings taken	30	13	36	15	...	...	...	...	4	2	...	1	...	3	...	...	3	4	111
Total Nuisances abated	1,273	951	1,592	1,208	143	104	133	83	438	194	141	101	386	397	482	251	1,314	619	9,810
Number of Cottages under Five Rooms...	7,435	4,964	9,037	729	522	923	688	367	4,409	2,621	1,285	402	4,552	3,510	3,221	826	3,805	8,167	57,463

* 8 samples from outside City.

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